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James Thomson
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SHOUT
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(A)

CATALOGUE

OF

BRITISH

INSECTS.

By JOHN REINHOLD FORSTER, F.A.S.

WARRINGTON:

PRINTED by WILLIAM EYRES.

MDCCLXX.

1770

THE author of this catalogue intends to publiſh a *Fauna* of *Britiſh Inſects*; and as he thinks not to ſet out upon it, till he can offer to the public a work, as little imperfect as poſſible, and to give no other deſcriptions than from ocular inſpection: he preſents his moſt reſpectful compliments to all ladies and gentlemen who collect inſects, and begs them to favour him, if poſſible, with ſpecimens of ſuch inſects, as they can ſpare, and which he is not poſſeſſed of: for this purpoſe he has made this catalogue, and put no mark to the inſects in his poſſeſſion; thoſe which he has ſo plentifully as to be enabled to give ſome of them to other collectors, are marked with a (*d*); thoſe which he has not, are marked either *Berk.* ſignifying *Dr. Berkenhout's Outlines of the Natural Hiſtory of Great Britain*; or *B.* ſignifying a manuſcript catalogue of *Britiſh Inſects* communicated to the author; or *B. B.* which ſignifies *Berkenhout*, together with the manuſcript catalogue. *N S.* is put to ſuch inſects as have not yet been deſcribed by Dr. *Linnæus*, and are *new ſpecies* with new ſpecific names. If therefore the author ſhould be ſo happy as to be favoured with ſpecimens, he will acknowledge the favour publickly, and give in return to any collector who deſires to exchange, ſuch inſects as he can ſpare. This catalogue contains 1000 inſects; the *Swedes* have near 1700, it would therefore be an honour to this country, to ſcrutinize carefully into the various branches of *Natural Hiſtory*, and to give the public as perfect and extenſive catalogues of *Britiſh Animals* as poſſible. The four firſt claſſes, containing *Quadrupeds*, *Birds*, *Reptiles* and *Fiſh*, have been ſo well and perfectly deſcribed by *Thomas Pennant* Eſq; that it would be a diſparagement, if the inſects ſhould be deſcribed defectively. But as Mr. *Pennant* has given up this branch to the author, he will do his utmoſt to give his work all the perfection which lies in his power. Therefore he takes this opportunity to ſhew the ladies and gentlemen collectors, how far he is gone by three years aſſiduous collecting in the neighbourhood of *Warrington*, and to enable at the ſame time the ſpirited and patriotic promotors of knowledge, and eſpecially of Natural Hiſtory in *Great Britain*, to contribute towards perfecting the Natural Hiſtory of their own country.

DRAWINGS and ſcientific deſcriptions of ſuch inſects as are not yet deſcribed by *Linnæus* will be ſtill more acceptable, and engage the publiſher's thanks and acknowledgments.

WARRINGTON,
Auguſt the 1ſt.
1770.

CATALOGUE

OF

BRITISH INSECTS.

I. COLEOPTERA.

1. SCARABÆUS.

1 1 TYPHŒUS.
2 2 Lunaris. B. B.
3 3 Cylindricus. *d.*
4 4 Nuchicornis.
5 5 Vacca. B.
6 6 Erraticus. B.
7 7 Foſſor.
8 8 Fimetarius. *d.*
9 9 Hæmorrhoidalis. B.
10 10 Conſpurcatus.
11 11 Stercorarius. *d.*
12 12 Vernalis. Berkenh.
13 13 Ovatus. B.
14 14 Sabuloſus.
15 15 Fullo. B.
16 16 Horticola. *d.*
17 17 Melolontha. *d.*
18 18 Solſtitialis. B. B.
19 19 Occidentalis. B.
20 20 Hemipterus. Berkenh.
21 21 Brunnus.
22 22 Auratus. B. B.
23 23 Quiſquilius.
24 24 Nobilis. Berkenh.
25 25 Rufipes.

2. LUCANUS.

26 1 Cervus. B. B.
27 2 Parallelepipedus.
28 3 Caraboides. Berkenh.

3. DERMESTES.

29 1 Lardarius.
30 2 Undatus. B.
31 3 Pellio.
32 4 Violaceus. B.
33 5 Feneſtralis.
34 6 Melanocephalus. B.
35 7 Domeſticus. Berkenh.
36 8 Scarabæoides. *d.*
37 9 Murinus. B.
38 10 Fumatus.
39 11 Pulicarius. Berkenh.
40 12 Pſyllius. B.
41 13 Scanicus. B.
42 14 Colon.

4. HISTER.

4. HISTER.

43 1 Unicolor. *d.*
44 2 Pygmæus.
45 3 Bimaculatus.
46 4 *Striatus.* N S.

5. CISTELA,

A Genus not in *Linnæus*, and only taken from *Geoffroy*.

47 1 *Faſciata.* N S. Geoff. 1. *d.*
48 2 *Puſtulata* N S. Geoff. 2.
49 3 *Nigra.* N S. Geoff. 3.
50 4 *Striata.* N S.
51 5 *Sericea.* N S. *d.*

6. BYRRHUS.

52 1 Scrophulariæ. Berk.
53 2 Verbaſci.

7. GYRINUS.

54 1 Natator. *d.*

8. SILPHA.

55 1 Germanica.
56 2 Veſpillo. *d.*
57 3 Bipuſtulata. B. B.
58 4 4-Puſtulata. B. B.
59 5 Littoralis.
60 6 Atrata.
61 7 Thoracica. *d.*
62 8 4-Punctata. *d.*
63 9 Opaca.
64 10 Rugoſa.
65 11 Sabuloſa. B. B.
66 12 Obſcura. *d.*
67 13 Rufipes
68 14 Aquatica. *d.*
69 15 Colon. B.
70 16 Griſea. B.
71 17 Pulicaria. Berkenh.
72 18 Pedicularia. B.

9. CASSIDA.

73 1 Viridis.
74 2 Murræa. *B.*
75 3 Nebuloſa. *B. B.*
76 4 Nobilis. *B. B.*
77 5 Maculata. *B. B.*
78 6 *Pallida.* N S.

10. CURCULIO.

79 1 Alliariæ.
80 2 Cyaneus. *B. B.*
81 3 Badenſis.
82 4 Aterrimus.
83 5 Ceraſi.
84 6 Pruni. Berkenh.
85 7 Acridulus. *B. B.*
86 8 Purpureus. B. B.
87 9 Frumentarius.
88 10 Granarius. Berkenh.
89 11 Dorſalis. Berkenh.
90 12 Pini. Berkenh.
91 13 Lapathi.
92 14 Scaber.
93 15 Quercus Berkenh.
94 16 Vicariæ. Berkenh.
95 17 *Ulicis.* N S.
96 18 5-Maculatus. *B. B.*
97 19 Pericarpius. Berk.
98 20 Anguinus.
99 21 Bacchus.
100 22 Betulæ.
101 23 Populi.
102 24 Alni. B. *B.*
103 25 *Rufulus.* N S.
104 26 Salicis
105 27 Fagi. B. B.
106 28 Beccabungæ. Berk.
107 29 Obſcurus. N S.
108 30 Pemorum.
109 31 Germanus. B.
110 32 Nucum. B. B.
111 33 Rumicis.
112 34 Scrophulariæ. *d.*
113 35 *Similis.* N S. *d.*
114 36 *Diſſimilis.* N S. *d.*
115 37 4-*Guttatus.* N S. *d.*

116 38 *Pollinarius.* N S.
117 39 *Longimanus.* N S.
118 40 Druparum.
119 41 Violaceus. B.
120 42 Tortrix. Berk.
121 43 Lineatus.
122 44 Incanus.
123 45 *Melanogrammus.* N S.
124 46 Nebulosus. Berkenh.
125 47 Exsoletus. N S. *d.*
126 48 Ligustici.
127 49 Ovatus.
128 50 Cervinus.
129 51 Oblongus.
130 52 Pyri.
131 53 Argentatus.

11. ATTELABUS.

132 1 Coryli. Berkenh.
133 2 Avellanæ. *d.*
134 3 Curculionoides.
135 4 Betulæ. *d.*

12. CLERUS

Of *Geoffroy*; with *Linnæus* they are species of *Attelabi.*

136 1 Apiarius. *B. B.*
137 2 Formicarius. *B. B.*
138 3 Mollis. *B.*
139 4 *Pilosus.* N S.
140 5 *Cylindricus.* N S.

13. ANTHRIBUS,

A genus not in *Linnæus,* and in *Geoffroy* only.

141 1 *Fasciatus.* N S. Geoff. 1.
142 2 *Nebulosus.* N S. Geoff. 2.

14. COCCINELLA.

143 1 Unipunctata. *B.*
144 2 Bipunctata. *d.*
145 3 5-Punctata. *B. B.*
146 4 6-Punctata. *B.*
147 5 7-Punctata. *d.*
148 6 9-Punctata.
149 7 11-Punctata.
150 8 12-Punctata. B.
151 9 13-Punctata.
152 10 13-*Maculata.* N S. *d.*
153 11 14-Punctata.
154 12 16-Punctata. Berk.
155 13 19-Punctata. *d.*
156 14 22-Punctata.
157 15 25-Punctata.
158 16 Conglobata. Berkenh.
159 17 14-Guttata. *d.*
160 18 2-Pustulata.
161 19 4-Pustulata. *d.*
162 20 6-Pustulata.
163 21 10-Pustulata. *d.*
164 22 Pantherina. B.

15. PTINUS.

165 1 Pectinicornis. B. B.
166 2 Pertinax. Berk.
167 3 Mollis. Berk.
168 4 Imperialis. B.
169 5 Fur. *d.*

16. BRUCHUS.

170 1 Granarius. B.

17. CHRYSOMELA.

171 1 Tanaceti.
172 2 Hæmorrhoidalis. B.
173 3 Graminis. B. B.
174 4 Ænea. B.
175 5 Alni. *d.*
176 6 Betulæ. *d.*
177 7 Hæmoptera.
178 8 Cerasi.
179 9 Padi.
180 10 Armoraciæ. B.
181 11 Cerealis. Berkenh.
182 12 Fastuosa.
183 13 Vitellinæ. *d.*
184 14 Polygoni. B. B.
185 15 Pallida.

186 16 Staphylea.
187 17 Polita.
188 18 *Hyperici.* N S. *d.*
189 19 Populi. *d.*
190 20 10-Punctata. *B.*
191 21 Boleti *B.*
192 22 Sanguinolenta. *B. B.*
193 23 *Olivacea.* N S. *d.*
194 24 Marginata. *d.*
195 25 Marginella. *d.*
196 26 4-Punctata. *B. B.*
197 27 2-Punctata. Berk.
198 28 Sericea. *d.*
199 29 Merdigera. *B.*
200 30 *Cratægi.* N S.
201 31 Caprææ.
202 32 Nymphææ. *d.*
203 33 Cyanella.
204 34 Melanopa.
205 35 Flavipes.
206 36 12-Punctata. Berk.
207 37 Phellandrii. *B. B.*
208 38 Asparagi. *B. B.*
209 39 Ceramboides. *B.*
210 40 Hirta.
211 41 Elongata. *B.*
212 42 Oleracea.
213 43 Chrysocephala.
214 44 Hyoscyami.
215 45 Atricilla.
216 46 Erythrocephala.
217 47 Helxines.
218 48 Exsoleta.
219 49 Nitidula. *d.*
220 50 Nemorum.
221 51 Fuscicornis. *B.*
222 52 *Xanthogona.* N S.
223 53 *Thoracica.* N S.

18. MORDELLA.

224 1 Aculeata. B B.
225 2 Humeralis.
226 3 Frontalis.
227 4 Thoracica.
228 5 Flava.
229 6 *Testacea.* N S.
230 7 *Melanopa.* N S.
231 8 *Fasciata.* N S.
232 9 *Clavicornis.* N S.

19. CANTHARIS.

(Meloë of *Linnæus.)*

233 1 Proscarabæus.
234 2 Vesicatoria. *B.*
235 3 Floralis. B.

20. TENEBRIO.

236 1 Molitor. B B.
237 2 Culinaris.
238 3 Fossor.
239 4 Pallens.
240 5 Mortisagus. B B.
241 6 Cæruleus.
242 7 *Violaceus.* N S.
243 8 Rostratus.

21. DYTISCUS.

244 1 Latissimus. Berk.
245 2 Marginalis.
246 3 Semistriatus.
247 4 Striatus.
248 5 Cinereus.
249 6 Sulcatus.
250 7 Maculatus.
251 8 Bipustulatus.
252 9 Uliginosus.
253 10 Granularis.
254 11 Minutus. B.
255 12 Piceus. B B.
256 13 Caraboides. B B.
257 14 Scarabæoides. B.
258 15 Fuscipes. Berkenh.

22. CARABUS.

259 1 Coriaceus.
260 2 Granulatus.
261 3 Hortensis.

262 4 Leucophthalmus.
263 5 Clatratus.
264 6 Violaceus. B B.
265 7 Sycophanta. B
266 8 Crepitans. B B.
267 9 Cyanocephalus.
268 10 Melanocephalus.
269 11 Ferrugineus.
270 12 Germanus.
271 13 Vulgaris.
272 14 Cupreus.
273 15 Piceus.
274 16 Velox.
275 17 Cæruleſcens.
276 18 Uſtulatus.
277 19 Crux minor.
278 20 Sexpunctatus. Berk.

23. CICINDELA.

279 1 Campeſtris.
280 2 Hybrida. *B.*
281 3 Riparia.
282 4 Flavipes.
283 5 Aquatica.

24. BUPRESTIS.

284 1 Chryſoſtigma. Berk.
285 2 Ruſtica.
286 3 Minuta. *B.*
287 4 Viridis. *B.*
288 5 Granularis. Berk.
289 6 *Fuliginoſa.* N S.

25. ELATER.

290 1 Bipuſtulatus.
291 2 Brunneus.
292 3 Ruficollis. Berk.
293 4 Meſomelus.
294 5 Caſtaneus.
295 6 Livens. *B.*
296 7 Sangiuneus. Berk.
297 8 Balteatus. *B B.*
298 9 Sputator. *B.*
299 10 Obſcurus.
300 11 Murinus.
301 12 Teſſelatus.
302 13 Æneus.
303 14 Pectinicornis.
304 15 Niger.
305 16 Linearis.

26. LAMPYRIS.

306 1 Noctiluca.
N. B. The author has not got the males of this ſpecies.
307 2 Coccinea. *d.*

27. MALACOPTERYX.
(Cantharis of *Linnæus)*

308 1 Fuſcus. *d.*
309 2 Lividus. *d.*
310 3 Obſcurus. *d.*
311 4 Æneus. *d.*
312 5 Bipuſtulatus. *d.*
313 6 Rufus.
314 7 Faſciatus. Berkenh.
315 8 Biguttatus. Berkenh.
316 9 Minimus.
317 10 Teſtaceus. *B.*
318 11 Cæruleus. *B.*
319 12 Melanurus. *d.*
320 13 Navalis.

28. LEPTURA.

321 1 Aquatica. *d.*
322 2 Melanura. *d.*
323 3 Rubra.
324 4 Teſtacea.
325 5 Virens. Berkenh.
326 6 Sexmaculata. *B.*
327 7 4-Faſciata. *B.*
328 8 Attenuata. *d.*
329 9 Myſtica.
330 10 Arcuata. *B.*
331 11 Præuſta. *B. B.*
332 12 Arietis. *d.*

29. CERAMBYX.

333 1 Coriarius. *B. B.*

334 2 Nebulosus.
335 3 Hispidus.
336 4 Moschatus.
337 5 Ædilis. *B.*
338 6 Lamed *B.*
339 7 Inquisitor. *d.*
340 8 Fuliginator. *d.*
341 9 Scalaris.
342 10 Populneus. *B.*
343 11 Rusticus. Berkenh.
344 12 Violaceus. *B.*
345 13 Bajulus. *B.*
346 14 Sanguineus. Berk.

30. STAPHYLINUS.

347 1 Murinus.
348 2 Erythropterus.
349 3 Maxillosus.
350 4 Politus.
351 5 Rufus. *Berkenh.*
352 6 Riparius. *Berkenh.*
353 7 Chrysomelinus. *Berk.*
354 8 Fuscipes.
355 9 Rufipes.

31. NECYDALIS.

356 1 Cærulea.
357 2 *Ceramboides.* N S.

32. FORFICULA.

358 1 Auricularia. *B. B.*
359 2 Minor.

II. HEMIPTERA.

I. BLATTA.

360 1 Orientalis. Berk.
361 2 Germanica.

2. GRYLLUS.

362 1 Bipunctatus. Berk.
363 2 Subulatus.
364 3 Gryllotalpa. Berk.
365 4 Domesticus.
366 5 Campestris. Berk.
367 6 Verrucivorus. Berk.
368 7 Grossus.

3. CICADA.

369 1 Cornuta. *d.*
370 2 Spumaria. *d.*
371 3 Nervosa.
372 4 Albifrons.
373 5 Leucocephala. Berk.
374 6 Lateralis. Berk.
375 7 Striata. *B. B.*
376 8 Lineata.
377 9 Interrupta.
378 10 Lanio.
379 11 Marginata.
380 12 Viridis.
381 13 Flava.
382 14 Aurata.
383 15 Ulmi. Berkenh.
384 16 Rosæ. Berkenh.

4. NOTONECTA.

385 1 Glauca. *d.*
386 2 Striata. *d.*
387 3 Minutissima. Berk.

5. NEPA.

388 1 Cinerea.
389 2 Cimicoides.
390 3 Linearis.

6. CIMEX.

6. CIMEX.

391 1 Lectularius.
392 2 Scarabæoides. Berk.
393 3 Clavicornis. Berk.
394 4 Corticalis. Berk.
395 5 Betulæ. Berk.
396 6 Filicis. Berkenh.
397 7 Rufipes. *d.*
398 8 Marginatus. Berkenh.
399 9 Grifeus.
400 10 Baccarum. Berkenh.
401 11 Juniperinus. Berk.
402 12 Prafinus.
403 13 Cæruleus. Berkenh.
404 14 Oleraceus. Berkenh.
405 15 Bicolor. Berkenh.
406 16 Acuminatus. Berk.
407 17 Perfonatus. Berk.
408 18 Ater.
409 19 Hyofcyami. Berk.
410 20 Equeftris. Berkenh.
411 21 Apterus. Berkenh.
412 22 Pabulinus.
413 23 Pratenfis. Berkenh.
414 24 Campeftris.
415 25 Umbratilis. Berk.
416 26 Nemorum.
417 27 Dolabratus.
418 28 Striatus. Berkenh.
419 29 Populi.
420 30 Ulmi. Berkenh.
421 31 Sylveftris.
422 32 Abietis. Berkenh.
423 33 Lacuftris.
424 34 Stagnorum.
425 35 Vagabundus. Berk.

7. APHIS.

426 1 Ribis.
427 2 Ulmi. } Berkenh.
428 3 Sambuci.
429 4 Rumicis.
430 5 Acetofæ.
431 6 Lychnidis.
432 7 Rofæ.
433 8 Tiliæ.
434 9 Braffícæ.
435 10 Craccæ.
436 11 Sonchi.
437 12 Cardui.
438 13 Tanaceti. } Berkenh.
439 14 Abfinthii.
440 15 Jaceæ.
441 16 Betulæ.
442 17 Fagi.
443 18 Quercus.
444 19 Salicis.
445 20 Populi.
446 21 Aceris.
447 22 Atriplicis

8. CHERMES.

448 1 Graminis.
449 2 Pyri.
450 3 Sorbi.
451 4 Urticæ. } Berkenh.
452 5 Alni.
453 6 Quercus.
454 7 Abietis.
455 8 Fraxini.

9. COCCUS.

456 1 Hefperidum.
457 2 Phalaridis. } Berkenh.
458 3 Betulæ.

10. THRIPS.

459 1 Minutiffima.
460 2 Phyfapus.
461 3 Juniperina. } Berkenh.
462 4 Fafciata.

III. LEPIDOPTERA.

1. PAPILIO.

463 1 Machaon. } Berk.
464 2 Podalirius. }
465 3 Cratægi.
466 4 Braſſicæ. *d.*
467 5 Rapæ. *d.*
468 6 Napi. *d.*
469 7 Sinapis.
470 8 Cardamines. *d.*
471 9 Hyale. Berkenh.
472 10 Rhamni. *d.*
473 11 Hyperantus. *d.*
474 12 Io. *d.*
475 13 Mæra. *d.*
476 14 Mægæra. *d.*
477 15 Ægeria. *d.*
478 16 Galathea.
479 17 Semele.
480 18 Jurtina. *d.*
481 19 Janira. *d.*
482 20 Cardui. B. B.
483 21 Iris. B. B.
484 22 Antiopa. B. B.
485 23 Polychloros.
486 24 Urticæ. *d.*
487 25 C. Album.
488 26 Atalanta.
489 27 Lucina. Berkenh.
490 28 Maturna. *d.*
491 29 Cinxia. Berkenh.
492 30 Paphia. *d.*
493 31 Aglaia. *d.*
494 32 Adippe.
495 33 Lathonia. Berkenh.
496 34 Euphroſyne. *d.*
497 35 Betulæ.
498 36 Quercus.
499 37 Argus.
500 38 Argiolus.
501 39 Rubi.
502 40 Pamphilus.
503 41 Phlæas. Berkenh.
504 42 Virgaureæ. *d.*
505 43 Comma. *d.*
506 44 Malvæ.
507 45 Tages. *d.*

2. SPHINX.

508 1 Ocellata. Berkenh.
509 2 Populi.
510 3 Tiliæ. B. B.
511 4 Convolvuli. B. B.
512 5 Liguſtri. B. B.
513 6 Atropos. B. B.
514 7 Elpenor. B. B.
515 8 Porcellus. B. B.
516 9 Stellatarum. *B. B.*
517 10 Fuciformis.
518 11 Apiformis. B.
519 12 Culiciformis. B.
520 13 Veſpiformis. B.
521 14 Tipuliformis.
522 15 Filipendulæ. *d.*
523 16 Statices.

3. PHALÆNA.

524 1 Pavonia. Berk.
525 2 Quercifolia. B. B.
526 3 Rubi. B. B.
527 4 Potatoria. B. B.
528 5 Pini. B. B.
529 6 Quercus. B. B.
530 7 Laneſtris. B. B.
531 8 Vinula.
532 9 Bucephala. B. B.
533 10 Verſicolora. B. B.
534 11 Populi. Berkenh.
535 12 Neuſtria. Berkenh.
536 13 Caja.
537 14 Villica. B. B.
538 15 Plantaginis.
539 16 Monacha. B. B.
540 17 Diſpar. B. B.

541 18 Chryſorrhoea. *d.*
542 19 Salicis. B. B.
543 20 Coryli. Berkenh.
544 21 Pudibunda.
545 22 Faſcelina.
546 23 Antiqua.
547 24 Gonoſtigma. B. B.
548 25 Cæruleocephala. B. B.
549 26 Ziczac. B. B.
550 27 Coſſus. B. B.
551 28 Aulica? B.
552 29 Lubricipeda. *d.*
553 30 Ruſſula. Berkenh.
554 31 Libatrix.
555 32 Oo. B. B.
556 33 Humuli.
557 34 Dominula. B. B.
558 35 Fuliginoſa.
559 36 Glyphica. *d.*
560 37 Mi.
561 38 Jacobææ. *d.*
562 39 Rubricollis. *d.*
563 40 Quadra. B. B.
564 41 Complana.
565 42 Nupta. B. B.
566 43 Pacta. B. B.
567 44 Pronuba. *d.*
568 45 Maura.
569 46 Fraxini. B. B.
570 47 Chryſitis.
571 48 Gamma. *d.*
572 49 Interrogationis.
573 50 Jota?
574 51 Feſtucæ. B. B.
575 52 Meticuloſa
576 53 Pſi.
577 54 Chi.
578 55 Aceris. B. B.
579 56 Nictitans.
580 57 Perſicaria.
581 58 Exſoleta. B. B.
582 59 Verbaſci.
583 60 Plecta.
584 61 Deraſa.
585 62 Braſſicæ.
586 63 Rumicis.
587 64 Oxyacanthæ. B. B.
588 65 Polyodon.
589 66 Oleracea.
590 67 Piſi. B. B.
591 68 Atriplicis. B. B.
592 69 Triplacia.
593 70 Pyramidæa.
594 71 Typica.
595 72 Delphinii. B. B.
596 73 Citrago. B. B.
597 74 Lactearia.
598 75 Putataria.
599 76 Vibicaria.
600 77 Thymiaria.
601 78 Punctaria.
602 79 Amataria. B. B.
603 80 Lacertinaria. Berk.
604 81 Sambucaria.
605 82 Syringaria.
606 83 Prunaria. B. B.
607 84 Elinguaria.
608 85 Pulveraria.
609 86 Betularia.
610 87 Wavaria.
611 88 Puſaria.
612 89 Papilionaria. B. B.
613 90 Defoliaria. Albin. t. 91. fig. G. H. I.
614 91 Viridata.
615 92 Chærophyllata. *d.*
616 93 Groſſulariata. *d.*
617 94 Cratægata. *d.*
618 95 *Miniata.* N S.
619 96 *Fulvata.* N S.
620 97 Populata.
621 98 Bilineata. *d.*
622 99 Chenopodiata.
623 100 Plagiata.
624 101 Prunata.
625 102 Fluctuata.
626 103 Remutata.
627 104 Alchemillata.
628 105 Marginata.
629 106 Urticata.
630 107 Nymphæata.
631 108 Potamogata.

632 109 Stratiotata.
633 110 Lemnata.
634 111 Brumata. Berkenh.
635 112 Praſinana.
636 113 Viridana.
637 114 Clorana. M B.
638 115 Hamana.
639 116 Oporana.
640 117 Bergmanniana.
641 118 Uddmanniana.
642 119 Brunnichana.
643 120 Probosciſalis.
644 121 Roſtralis. Berk.
645 122 Forficalis.
646 123 Verticalis.
647 124 Pinguinalis.
648 125 Evonymella.
649 126 Padella.
650 127 Culmella. Berk.
651 128 Salicella. Berkenh.
652 129 Tapetzella. Berkenh.
653 130 Sarcitella. *Berkenh.*
654 131 Granella. *Berkenh.*
655 132 Serratella.
656 133 Pomonella. *B. B.*
657 134 Calthella.
658 135 Swammerdamella.
659 136 Geoffrella.
660 137 Friſchella. *d.*
661 138 Rajella.
662 139 Didactyla. *Berkenh.*
663 140 Pentadactyla. *Berk.*
664 141 Tridactyla.
665 142 Hexadactyla.

IV. NEUROPTERA.

1. LIBELLULA.

666 1 4-Maculata.
667 2 Flaveola.
668 3 Depreſſa.
669 4 Vulgatiſſima. *Berk.*
670 5 Cancellata.
671 6 Ænea.
672 7 Grandis. *Berkenh.*
673 8 Forcipata.
674 9 Virgo.
675 10 Puella.

2. RAPHIDIA.

676 1 Ophiopſis. B.

3. EPHEMERA.

677 1 Vulgata.
678 2 Marginata.
679 3 Veſpertina. *Berk.*
680 4 Bioculata.
681 5 Fuſcata. B.
682 6 Culiciformis. *Berk.*
683 7 Horaria. *Berk.*
684 8 Striata. *Berk.*
685 9 Diptera.

4. PHRYGANEA.

686 1 Bicaudata.
687 2 Nebuloſa. *Berkenh.*
688 3 Striata. *Berkenh.*
689 4 Griſea. *B.*
690 5 Grandis. *B.*
691 6 Rhombica.
692 7 Flavilatera. *Berk.*
693 8 Nigra. *Berk.*
694 9 Ciliaris.
695 10 Longicornis.

5. HEMEROBIUS.

696 1 Pectinicornis. *Berkenh.*
697 2 Perla.
698 3 Chryſops.
699 4 Albus.
700 5 Hirtus.
701 6 Specioſus.
702 7 Sexpunctatus.

703 8 Humuli.
704 9 Lutarius.

6. PANORPA.

705 1 Communis.

7. MYRMELLON.

706 1 Formicarium. *Berk.*

V. HYMENOPTERA.

1. APIS.

707 1 Humulorum.
708 2 Centuncularis. *Berk.*
709 3 Rufa.
710 4 Bicornis.
711 5 Floriſomnis.
712 6 Helvola.
713 7 Succincta.
714 8 Cæruleſcens.
715 9 Mellifica.
716 10 Cunicularia.
717 11 Manicata. *Berk.*
718 12 4-Dentata.
719 13 Conica.
720 14 *Vernalis.* N S.
721 15 *Lamii.* N S.
722 16 Ruficornis.
723 17 Ferruginata.
724 18 Terreſtris.
725 19 Hortorum.
726 20 Pratorum.
727 21 Lapidaria.
728 22 Muſcorum.
729 23 Acervorum.
730 24 Subterranea. *Berkenh.*
731 25 *Pennipes.* N S.

2. FORMICA.

732 1 Herculeana.
733 2 Rufa.
734 3 Nigra.
735 4 Rubra.
736 5 Fuſca.
} *Berkenh.*

3. VESPA.

737 1 Crabro.
738 2 Vulgaris.
739 3 Parietum.
740 4 Muraria.
741 5 Spinipes.
742 6 Coarctata. *Berkenh.*

4. CHRYSIS.

743 1 Ignita.
744 2 Aurata.

5. SIREX.

745 1 Gigas. *Berkenh.*
746 2 Juvencus.

6. TENTHREDO.

747 1 Enodis.
748 2 Uſtulata.
749 3 *Cyanocrocea.* N S.
750 4 *Atrata.* N S.
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752 6 Lutea. *Berkenh.*
753 7 Nitens.
754 8 *Arcuata.* N S.
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756 10 Scrophulariæ.
757 11 Abietis.
758 12 Padi.
759 13 Salicis.
760 14 Atra.
761 15 Viridis.
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763 17 Roſæ.
764 18 Bicincta.
765 19 Cincta.
766 20 Livida.
767 21 Nigra.

768 22 Naſſata.
769 23 Cynoſbati.
770 24 Capræ.

7. CYNIPS.

771 1 Glechomæ. *Berkenh.*
772 2 Quercus baccarum.
773 3 Quercus folii.
774 4 Quercus petioli. *Berk.*
775 5 Quercus gemmæ. *Berk.*
776 6 Bedeguaris.
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8. SPHEX.

778 1 Sabuloſa. *d.*
779 2 Viatica. *d.*
780 3 Fuſca. *d.*
781 4 Cribraria. *d.*
782 5 Foſſoria. *d.*
783 6 Leucoſtoma.
784 7 Pectinipes.
785 8 *Xanthocephala.* N S.
786 9 *Spinoſa.* N S.

9. ICHNEUMON.

787 1 Luteus.
788 2 Ramidulus.
789 3 Luctatorius.
790 4 Perſuaſorius. *Berkenh.*
791 5 Foſſorius.
792 6 Manifeſtator.
793 7 Titillator.
794 8 Inculcator. *Berkenh.*
795 9 Pugillator.
796 10 Ruſpator. *Berkenh.*
797 11 Corruſcator.
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802 16 *Armatorius.* N S.
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804 18 Sugillatorius.
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813 27 Aphidum. *Berkenh.*
814 28 Ovulorum.
815 29 Glomeratus.
816 30 Globatus. *Berkenh.*
817 31 Pectinicornis. *Berk.*

VI. DIPTERA.

1. TIPULA.

818 1 Pectinicornis.
819 2 Rivoſa.
820 3 Crocata.
821 4 Oleracea.
822 5 Hortorum.
823 6 Variegata.
824 7 Contaminata.
825 8 Lunata. *Berkenh.*
826 9 Cornicina. *Berkenh.*
827 10 Atrata.
828 11 Arundineti.
829 12 Plumoſa. *Berkenh.*
830 13 Littoralis.
831 14 Motitatrix. *Berkenh.*
832 15 Monilis. *Berkenh.*
833 16 Thomæ.
834 17 Johannis.
835 18 Brevicornis.
836 19 Febrilis.
837 20 Hortulana. *Berk.*
838 21 Phalænoides.

2. CULEX.

839 1 Pipiens.
840 2 Bifurcatus. } *Berkenh.*
841 3 Pulicaris. }

3. EMPIS.

842 1 Pennipes.
843 2 Livida.
844 3 Stercorea.

4. ASILUS.

845 1 Crabroniformis. *Berk.*
846 2 Marginatus.
847 3 Forcipatus.
848 4 Oelandicus.
849 5 Tipuloides. *Berk.*
850 6 Morio.

5. CONOPS.

851 1 Roſtratus.
852 2 Calcitrans.
853 3 Irritans.
854 4 Veſicularis.
855 5 Macrocephala. *Berk.*

6. BOMBYLIUS.

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857 2 Medius.
858 3 Minor. *Berkenh.*

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927 2 Autumnalis.
928 3 Pluvialis.
929 4 Cæcutiens.

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930 1 Bovis. } *Berk.*
931 2 Hæmorrhoidalis. }
932 3 Ovis. }

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934 1 Viridis,
935 2 Plumbea,
936 3 Villosa,
937 4 Aquatica. } *Berk.*

3. TERMES.

938 1 Pulsatorium. *Berk.*

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997 5 Asellus.
998 6 Armadillo. *Berk.*

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999 1 Lagura.
1000 2 Forficata.
1001 3 Electrica. } *Berk.*
1002 4 Marina.

14. JULUS.

1003 1 Terrestris. *Berk.*
1004 2 Sabulosus.

FINIS.

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du Dr Maurice ROYER
M No 253, II

NOVÆ SPECIES INSECTORUM.

CENTURIA I.

AUCTORE

JOANNE REINOLDO FORSTERO, S. A. S.

Nam mihi contuenti se persuasit rerum natura, nihil incredibile existimare de ea. Plin. lib. xi. c. 2.

LONDINI,

Veneunt apud T. Davies, in Russel-street; et B. White, in Fleet-street.

MDCCLXXI.

VIRO GENEROSISSIMO

JOSEPHO BANKS,

ARMIGERO,

PEOPLES COLLEGE NORWICH

JOANNES REINOLDUS FORSTER

S. P. D.

ABSOLUTO ingenti & laboriosо itinere, quo totum quem incolimus globum ambitu complexus es ; id præsertim effectum est ut nostra Anglia in posterum futuris naturæ consultis, ditiores thesauros rerum ad rem herbariam & Zoologiam spectantium, perlustrandos offerre poterit, quam universa reliqua Europa. Hæc TUA ingentia in studium rerum naturalium merita, posteritas sera grato animo deprædicabit. Patere quæso, ut TUO potissimum nomini, hancce *Novorum Insectorum* centuriam, inscribam. Etiamsi enim hac opella, paucula tantum describantur, eaque minuta Insecta, sunt tamen eadem nova, ideoque rerum naturalium particulam quandam illustratum iri hisce pagellis confido. Idque mihi spem facit, fore ut pro ingenti quo historiam naturalem complecteris amore, hanc Insectorum centuriam serena fronte accipere digneris, & uti monimentum, quo publice

 declarem,

declarem, quam ego lubenti promoque animo, nomen meum profitear inter eos qui TE diligunt, honorant, admirantur; quantoque id mihi honori ducam, TIBI reique publicæ litterariæ felicem auſpicatumque reditum TUUM ex altero orbe publice congratulari. Quamque paratus ſim TIBI animi & corporis vires integerrimas, ad ſuſtinendos labores novi quod meditaris itineris; & omnia fauſta proſperaque, reditumque felicem ornatum ſpoliis novis maris & orbis oppoſiti, non tantum apprecari, verum & ipſe ſi numini id placuerit, eadem pericula TECUM adire, eaſdem voluptates ex naturæ ſtudio ſub novo cœlo TECUM participare. Vale.

Dabam Londini, VII. ante
kalendas Octobris.

PRÆ-

PRÆFATIO.

ANTE hos duo vel tres annos, quum primum viderem, quam multis novis inſectorum ſpeciebus Anglia noſtra abundet, & quantæ copiæ quotannis in varia Gazophylacia Naturæ conſultorum Britanniæ e tranſmarinis undique confluant regionibus; conſilium cepi, omnes novas ſpecies a me viſas & quas illuſtris LINNÆUS non inſeruit poſtremæ editioni ſyſtematis ſui, proprio marte deſcribere. Hoc opus ultra centuriam brevi accrevit, & adhuc tanta novorum inſectorum copia in variis optimatum & amicorum Gazis a me eſt examinata, ut facile inde ſecundam centuriam, novorum inſectorum colligere poſſem. Ideo hac centuria ſpeciminis loco & experiundi gratia in publicum emiſſa experiar, num hæc mea opella, publico placeat, nec ne.

Si arriſerit pluribus, volens lubenſque & quantocyus potero ſecundam centuriam publici juris faciam; ſin ſecus acciderit in hac ſola centuria ſubſiſtere animus eſt.

Tabulas nunc ad hanc opellam addere ſupervacaneum cenſui, quia deſcriptiones tanta cura diligentiaque ſunt exaratæ, ut tabulæ minus ſint neceſſariæ: præterea eſt mihi animus quaſdam tabulas huc ſpectantes operi inſerere, quo philoſophiam entomologicam & genera inſectorum lingua Anglica olim tractare ſtatui. Latina lingua ideo

præcipue

præcipue hæc ſcripſi, quod per omnem Europam eruditis communis ejus linguæ ſit uſus & quod in hiſce oris nobiliſſimæ plures & clariſſimæ feminæ eandem probe intelligant.

Inſecta a nobis deſcripta partim ſunt Angliæ indigena partim ab exteris oris advecta, quædam ab India Chinaque allata, alia Americæ ſeptentrionalis propria, alia a freto Gaditano importata.

Si quando auctores eorum inſectorum meminere, quæ a nobis ſunt deſcriptæ, ubicunque potui, eos adduxi, ne quid diligentiæ noſtræ deeſſe videatur.

Id præterea mei credo eſſe officii, publice gratias agere amicis, qui non ſolum Gazas ampliſſimas mihi aperuere, ut inde multa nova deſcriberem inſecta; verum etiam plurima mihi dono dedere, ut curatius examinata deſcriptaque publicare poſſem.

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NOVÆ

NOVÆ SPECIES
INSECTORUM.

CENTURIA I.

I. COLEOPTERA.

SCARABÆUS.

1. SCARABÆUS EXCAVATUS.

Scutellatus, thorace inermi, retuſo-excavato, capitis cornu incurvato compreſſo, elytris obſolete punctato-ſtriatis.

Habitat ad fretum Gaditanum.

MAGNITUDO et ſtatura fere ad SCAR. *naſicornem* accedit. Corpus totum ſupra obſcurum, ferrugineo-piceum; ſubtus pallidius, villis ſubfulvis hirtum.

ANTENNÆ piceæ.

CAPITIS labium bifidum; clypeus ſinuatus deſinens in cornu breve, acutum, baſi latius, compreſſum, thoracem verſus flexum.

THORAX valde convexus, marginatus, adſperſus punctis minutiſſimis, antice retuſus, profunde excavatus, tuberculo utrinque ad cavitatis marginem.

SCUTELLUM triangulare, obtuſum.

ELYTRA, lævia, marginata, obſolete punctata; punctis per ſtrias numeroſas diſpoſitis; adeſt tamen ſtria punctorum, magis conſpicua, utrinque ad futuram.

PEDES picei, primi paris nudi, poſtici pilis rarenter adſperſi. *Tibiæ* anticæ tri-dentatæ, cum ſpina ad apicen; poſteriores truncatæ, apice biſpinoſæ. *Tarſi* biunguiculati; primi paris, ungue altero valido.

2. SCARABÆUS CHINENSIS.

Scutellatus muticus, viridi-ſericeus, glaber, ſubtus viridi-inauratus, elytris obtuſis, ſubmucronatis.

Habitat in China.

CORPUS magnitudine SCAR. *Rhinocerotis*, totum ſmaragdino auratoque colore ſplendidiſſimum, depreſſum.

ANTENNÆ nigræ, triphyllæ; lamellæ, fere capitis longitudine.

CLYPEUS Capitis antrorſum anguſtatus, lateribus marginatus, apice præmorſus.

THORAX marginatus, poſtice ſinuatus, verſus ſcutellum productus.

SCUTELLUM minutum, acutangulum.

ELYTRA glaberrima, apice rotundata, obtuſa & ad ſuturæ apicem mucrone breviſſimo.

PECTUS, Abdomen & Pedes ferrugineo-cuprei, at in nonnullis viridi-inaurati ut latus ſuperius corporis. Pectus antice in mucronem obtuſum productum.

TIBIÆ ſecundi & tertii paris, apice ſpinis quatuor ſeu quinque armatæ.

TARSI nigri, in aliis virides.

ALÆ fuſcæ.

INSECTUM totum glaberrimum ſplendens, pilis non niſi rarenter ſub capite & in femoribus prioribus adſperſum.

3. SCARABÆUS HUDSONIAS.

Exſcutellatus, muticus, ater, thorace convexo lunato, clypeo rotundato, emarginato, elytris poſtice emarginatis, femoribus poſticis elongatis.

Drury. illuſtr. t. 35. f. 7.

Habitat in Americæ Septentrionalis provinciis Nov. Eboracenſi & Marilandiâ.

MAGNITUDO ad Sc. *Typhoeum* accedit.

ANTENNÆ piceæ, capitulis tryphyllis.

CLYPEUS capitis rotundatus emarginatus.

THORAX valde convexus, lunatus.

ELYTRA poſtice gibba, obtuſiſſima, vel potius emarginata; in ſingulo ſtriæ octo maxime obſoletæ.

LAMINA magna triquetra pone elytra, ad anum, quæ cum elytris, thorace & clypeo, punctis minutiſſimis elevatis conſita.

TIBIÆ anticæ ſpina ad apicem & dentibus tribus majoribus armatæ; inter & pone hos dentes adſunt alii plures minimi. Tibiæ reliquæ ſubcompreſſæ, priſmaticæ, ad angulos dentatæ, ciliatæ.

FEMORA & tibiæ poſticæ elongatæ. Dens ad baſin femorum duorum poſteriorum parium.

SIMILIS Sc. *Schæfferi*, ſed duplo major.

4. SCARABÆUS FLEXILIS.

Scutellatus, muticus, apterus? capite thoraceelytrisque fusco-lividis, lævissimis, elytris coriaceis, flexilibus obtusis, ciliatis.

Habitat in Hispaniâ ad fretum Gaditanum.

CORPUS magnitudine & habitu Sc. *sepicolæ*, apterum?

LABIUM quasi futurâ a capite distinctum marginatum.

ANTENNÆ ferrugineæ triphyllæ.

THORAX convexus, suborbiculatus, lævis, glaber, ad margines pilis testaceis ciliatus.

SCUTELLUM semi-orbiculatum.

ELYTRA obtusa, paululum abbreviata, coriacea, flexilia glaberrima, apice pilis tenuissimis ciliata.

PECTUS, Abdomen subtus, femoraque pallide livida, pilis concoloribus in pectore & femoribus densioribus, at in abdomine rarioribus adspersa.

FEMORA postica clavata.

TIBIÆ posticæ obconicæ compressiusculæ, apice ciliatæ.

TARSI fusco-ferruginei.

5. SCAR-

5. SCARABÆUS PICEUS.

Scutellatus muticus, totus piceus, pectore piloſo, elytris ſtriatis punctis impreſſis.

Habitat in America Septentrionali.

CORPUS magnitudine inferius SCAR. *Stercorario*; ſed idem habitu; totum piceum.

ANTENNÆ parvæ, capitulis triphyllis.

CAPUT breve, lunatum, a labio futurâ diſtinctum.

THORAX valde convexus, retuſus, antice tuberculo brevi ad nucham; poſtice truncatus, piceus punctis impreſſis ſparſis.

ELYTRA picea, ſtriis circiter tredecim ex punctis impreſſis.

PECTUS & Epigaſtrium pilis rufis confita.

PEDES piceo-ferruginei, poſteriores valde remoti.

TIBIÆ omnes dentatæ, primi paris ſpina porrectâ.

6. SCARABÆUS GAGATES.

Scutellatus, muticus, totus ater, glaber, nitens, alis fuſcis.

Habitat ad Sierra Leon Africæ.

CORPUS magnitudine SCAR. nitidi, totum aterrimum, vel colore Gagatis, nitidum, politum.

ANTENNÆ nigræ, piloſæ capitulis triphyllis.

CLYPEUS capitis quadrangularis marginatus.

THORAX ater, politus.

SCUTELLUM triangulare, acutangulum.

ELYTRA atra polita, abſque ſtriis aut punctis ullis.

STERNUM in mucronem obtuſum, brevem productum.

PEDES nigri, pilis nigris ſparſis.

TIBIÆ dentato-ſpinoſæ.

7. SCARABÆUS DELTA.

Scutellatus, muticus, flavus, thorace atro, triangulo flavo, elytris teſtaceo-rufis, nigro trimaculatis.

Habitat———

CORPUS magnitudine SCAR. *Horticolæ*, vel paulo minus, ſubtus totum lana flava tectum.

ANTENNÆ piceæ, triphyllæ.

CAPUT nigrum, lineâ tranſverſali inter oculos flavâ; ore maxilliſque ferrugineis.

THORAX ater, flavo marginatus; in medio lineæ flavæ tres, una margini antico parallela, duæ alteræ verſus ſcutellum fere coeuntes, triangulum ſubæquilaterum, areâ nigrâ, conſtituunt.

SCUTELLUM atrum, medio macula cordata flava, ſæpius fere totum Scutellum tegente.

ELYTRA lutea, vel e fulvo teſtacea, ſuturâ nigra in qua poſt Scutellum, lineolæ binæ flavæ; dein maculæ parvæ, oblongæ, nigræ duæ in ſingulo elytro verſus apicem; cum puncto minori, in medio vel potius verſus baſin. Elytra apice obtuſiſſima.

LAMINA ſupra anum oblonga, inflexa, flava, lineolâ nigrâ. Abdomen & Pectus flava.

PEDES ferruginei, tarſis omnibus, tibiiſque poſticis nigris; pedes poſtici elongati, femoribus craſſiſſimis.

8. DER-

DERMESTES.

8. DERMESTES FASCIATUS.

Ovatus ater, capite, thoraciſque lateribus utrinque macula ferruginea; elytris faſciis duabus, tibiis tarſiſque ferrugineis.

Habitat in Americæ Septentrionalis provincia Nov-Eboracenſi.

MAGNITUDO fere DERM. *Scarabæoidis.*

CORPUS ovale, atrum, omnino facie Coccinellæ, ſed abdomen ſubtus non adeo planum.

CAPUT receptum ſub thorace, macula rufa verſus thoracem.

ANTENNÆ breves ferrugineæ, undecim articulorum, articulis tribus extimis craſſioribus.

PALPI ferruginei.

THORAX antice emarginatus, utrinque ad latera macula magna ferruginea.

ELYTRA atra, glabra, faſciâ in medio, & altera ad apicem ferruginea, utrâque nec futuram nec marginem attingente.

FEMORA nigra.

TIBIÆ ferrugineæ, anticæ dentatæ.

TARSI ferruginei, articulis tribus.

ANTHRIBUS. Geoffr. inſ. I. p. 306.

Antennæ clavatæ.

Caput exſertum.

Thorax latus, marginatus.

Elytra lata, brevia.

Tarſus quatuor articulorum.

9. ANTHRIBUS FASCIATUS.

Obovatus, niger, elytris rufis, ſtriis elevatis nigris, cano-interruptis.

Geoffr. inſ. I. p. 306. t. 5. f. 3. *Anthribus ovatus, niger, elytris ſtriatis rubro nigroque marmoratis.*

Habitat in Anglia.

MAGNITUDO Hiſt. pygmæi.

THORAX & *Caput* nigra, pilis aliquot ſparſis cinereis.

ELYTRA rufa; in ſingulo ſtriæ quatuor vel quinque elevatæ, e maculis nigris cinereiſque, alternatim poſitis.

ABDOMEN ſupra, (i. e. ſub elytris) & anus, rubra.

10. ANTHRIBUS NEBULOSUS *.

Ovatus fuscus, antennis ferrugineis, elytris nebulosis.

Habitat in Anglia.

MAGNITUDO Byrrhi Verbasci *Linn.* totus pallide fuscus, pilis densis consitus.

ANTENNÆ ferrugineæ, capitulo ovato, trium articulorum.

CAPUT retractile.

ELYTRA maculis ferrugineo-fuscis sparsis.

PEDES pilosi.

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* Genus ANTHRIBI ob antennas plane diversas ab antennis *Dermestis* et ob corporis singularem habitum a Dermestibus separavi; Dermestis genus plane confiteor esse maxime intricatum; ideoque optimum duxi, ab eodem unum hoc genus Anthribi segregare.

HISTER.

11. HISTER STRIATUS.

Ater, thorace elytriſque ſtriis elevatis.

Habitat in Anglia.

CORPUS Hiſt. Pygmæo dimidio minus, totum atrum.

THORAX latus marginatus, ſtriis elevatis in medio quatuor, ad utraque latera duabus.

ELYTRA abbreviata, ſtriis elevatis in utroque novem, punctiſque impreſſis inter ſtrias.

ABDOMEN & Pectus punctis crebris impreſſis.

TIBIÆ omnes glabræ.

CISTELA. Geoffr. inſ. I. p. 115.

Antennæ extrorſum craſſiores, & perfoliatæ.

Thorax conicus, marginatus.

Caput intra thoracem retractile, inflexum.

Corpus globoſo-cylindricum.

Pedes compreſſi *, tarſis quinque articulorum.

12. CISTELA FASCIATA. †

Subvilloſa fuſca, faſciis longitudinalibus nigricantibus interruptis.

Geoffr. inſ. I. p. 116. t. 1. f. 8. & *Schæff. ic. inſ. Ratiſb.* t. 95. f. 3.

Habitat in arena & campis arenoſis Angliæ.

CORPUS obovatum, magnitudine Chryſom. *politæ*.

CAPUT retractile.

THORAX convexus, conicus, pectus ex parte ambiens; tectus pilis rufis aureum quaſi ſplendorem efficientibus.

ELYTRA fuſca, ſtriis circiter quatuor longitudinalibus interruptis: pilis nigris erectiuſculis nigram maculam conſtituentibus; pallidis appreſſis, pallidam.

ABDOMEN, Pedes, Antennæque nigræ.

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* In Ciſtelis mortuis aut tactis, pedes intra foveolam abdominis plicati, adpreſſique, et tarſi in foſſulam tibiarum recipiuntur.

† Male *Andr. Jo. Bladh* Ciſtelam faſciatam, cum *Byrrho pilula* Linn. committit. ſunt enim prorſus diverſa inſecta; præſertim ſi celeb. Linnæi definitionem & deſcriptionem in Fauna Suec. n. 427. conferre voluerit cum celeb. Geoffroyi & noſtris deſcriptionibus.

13. CI-

13. CISTELA PUSTULATA.

Ovata nigra, maculâ elytrorum rufa, undata, *Geoffr. inſ.* I. p. 116. n. 2.

Habitat cum præcedente.

MAGNITUDO Chryſ. faſtuoſæ.

CORPUS ovatum, undique nigrum.

THORAX maculis quibuſdam e pilis rufis.

ELYTRA nigra, macula rufa, ſeſquitertia e pilis rufis cincta in margine pilis albicantibus.

CISTELÆ antennis, thorace, pedibus, et tota corporis ſtructura adeo differunt a reliquis inſectis ejuſdem claſſis & ordinis, ut non tam Geoffroyi diviſionem, quam potius ipſam naturam ſequutus ſim in determinando hoc genere: licet *And. Jo. Bladh* in *Fundamentis Entomologicis* nuper Byrrhum Linnæi cum Ciſtela commiſerit; id tamen re curatius examinata reperi, hæc duo genera toto cœlo eſſe diverſa nec ullo modo, ad idem genus revocari poſſe & neque ipſum clariſſ. LINNÆUM judicem in hoc negotio recuſo: ſi enim plures ſpecies hujus generis vidiſſet, utique credo, eum pro ingenti quo conſpicuus eſt veritatis amore, id nobis daturum, nos recte hoc genus a reliquis ſejunxiſſe.

14. CISTELA NIGRA.

Ovata, tota nigra, nitens glabra.
Geoffr. inſ. I. p. 117. n. 3.

Habitat cum prioribus hujus generis.

CORPUS totum nigrum, antecedenti minus, nitens, glabrum.

ELYTRA ſtriis obliteratis, circiter decem in ſingulo elytro.

15. CISTELA STRIATA.

Obovata nigra, elytris ſtriatis.

Habitat in arenâ Angliæ.

CORPUS magnitudine & ſtatura Ciſtelæ *faſciatæ*.

ELYTRA nigra, in ſingulo faſciæ quatuor vel quinque longitudinales concolores, ſed nitentes, incluſæ ſtriis obliteratis.

16. CISTELA SERICEA *.

Ovata, fuſco-viridis, elytrorum faſciis longitudinalibus interruptis.

Habitat cum præcedentibus.

MAGNITUDO Ciſt. nigræ.

CAPUT & thorax viridi-fuſca, nitentia.

ELYTRA faſciis quinque vel ſex longitudinalibus viridi-ſericeis, interruptis, maculis e pilis nigris erectiuſculis. Intervalla faſciarum minus læte virentia.

SILPHA.

17. SILPHA Noveboracensis.

Nigra, elytris piceis: lineis elevatis subternis, clypeo retuso, disco atro, margine rubro.

Habitat in Americæ Septentrionalis provincia Noveboracensi.

Corpus magnitudine Silphæ *atratæ*, nigrum totum.

Clypeus thoracis antice retusus, margine rubro, disco nigro, punctis excavatis sparsis obsitus.

Scutellum nigrum.

Elytra punctis excavatis sparsis piceis s. rubicundis, lineis elevatis, duabus futuræ proximis longitudine elytrorum, tertia exteriore abrupta.

COCCINELLA.

18. COCCINELLA TREDECIM-MACULATA.

Coleoptris luteis, punctis nigris tredecim; thorace albo nigro-punctato.

Habitat in Pinis, Corylis, Plantisque variis Angliæ.

Corpus magnitudine Cocc. 14 *punctatæ*, hemisphæricum nigrum.

Antennæ rufæ.

Caput album, ore punctisque duobus ad thoracem contiguis nigris.

Thorax albus puncto nigro Scutello proximo, cincto maculis quatuor majoribus nigris; ad latera thoracis in plerisque punctum aliud nigrum.

Elytra fulva seu lutea, punctis in utroque elytro; primum uno, dein tribus, post duobus, denique unico communi ad basin futuræ.

Pedes pallidi, in quibusdam fusci; geniculis pallidis.

CHRY-

CHRYSOMELA.

19. CHRYSOMELA SAPPHIRINA.

Ovata, tota ſapphirina, nitida, ore oculiſque rubris antennis nigris.

Habitat———

CORPUS triplo majus Chryſomela *ſanguinolentâ*, totum colore nitidiſſimo ſplendente viridi-ſapphirino, vel cyaneo ornatum.

ANTENNÆ nigræ.

THORAX & ELYTRA punctis minutiſſimis ac vix perſpicuis adſperſa.

TARSI ſubtus fuſci.

20. CHRYSOMELA HYPERICI.

Ovata, atro-cærulea, elytris nigro-æneis, ſtriato-punctatis, alis rubris.

Habitat in *Hyperico perforato* Angliæ.

MAGNITUDO Chryſ. faſtuoſæ.

ANTENNÆ fuſcæ.

CAPUT & *Thorax* viridi ænei.

ELYTRA viridi-ænea, exarata punctis profunde excavatis per paria & glomeres, in ſtrias longitudinales diſpoſitis; ſtriis in ſingulo elytro novem.

ABDOMEN & pectus viridi-cærulea, nitentia.

PEDES viridi-nigri.

21. CHRYSOMELA RHOI.

Ovata ferruginea, capite, thorace & ſtriis aliquot elytrorum pallidis.

Habitat in RHOE *glabra* Linn. Americæ Septentrionalis. Anglis in America *the Sumach-bug* dicta.

CORPUS magnitudine chryſ. *politæ*, feminæ.

ANTENNÆ baſi ferrugineæ, cetera fuſcæ.

OCULI nigri.

CAPUT & *Thorax* cum pectore pallida.

ELYTRA ferruginea, ſtria longitudinali ad marginem & aliquot in medio elytrorum pallidis; ſtriæ punctorum profunde excavatorum decem vel undecim.

TARSI articulis tribus.

22. CHRYSOMELA LINEATO-PUNCTATA.

Ovata, thorace rufo, diſco punctis nigris; elytris rufis, futura, punctis lineoliſque nigris.

Habitat in Americæ ſeptentrionalis provincia Noveboracenſi.

MAGNITUDO fere chryſ. *politæ*, habitus chryſ. *populi*.

ANTENNÆ baſi ferrugineæ, articulis quinque extimis craſſioribus fuſcis.

CAPUT parvum ferrugineum verſus thoracem nigrum.

OCULI nigri.

THORAX utrinque margine rufo craſſiuſculo; pars depreſſa picea, maculis aliquot obſcuris nigris.

SCUTELLUM nigrum.

ELYTRA pallide rufa, futura utrimque nigra; punctum nigrum ad baſin elytri, aliud prope apicem; ad marginem linea ex maculis tribus coadunatis nigris; in medio lineæ duæ parallelæ nigræ; punctum minimum nigrum ad baſin elytri.

ABDOMEN infra nigrum nitidum.

ALÆ fuſcæ.

PEDES ferruginei.

FEMORA medio nigra.

TARSI quatuor articulis.

23. CHRYSOMELA olivacea.

Ovata, nigra, capite, thorace, elytris pedibuſque olivaceis, elytris ſtria longitudinali & futura nigra.

Habitat in Anglia; lecta primo vere, in arena.

Corpus magnitudine & habitu chryſ. vitellinæ.

Caput olivaceum, ad thoracem collari nigro.

Oculi nigri.

Antennæ fuſcæ, baſi pallidæ.

Thorax latus, convexus, punctatus, olivaceus.

Elytra olivacea, cum ſtriis punctorum excavatorum; faſcia longitudinalis nigra a baſi ad apicem, in medio elytri, alia margini futuræ communis, itidem nigra.

Abdomen nigrum, punctatum.

Pedes olivacei; in quibuſdam nigri, geniculis olivaceis.

Variat quoque capite, thorace, elytriſque colore ſordide rubro, loco olivacei.

24. CHRYSOMELA FRONTALIS.

Ovata nigra, capite, antennarum baſi, elytrorum margine, & pedibus ferrugineis.

Habitat in Americâ Septentrionali.

MAGNITUDO media.

CORPUS totum nigrum, oblongo-ovatum.

CAPUT ferrugineum.

OCULI nigri.

ANTENNÆ baſi ferrugineæ, reliqua fuſcæ.

THORAX fere orbiculatus, niger, nitens.

ELYTRA obſcure ſtriata, nigra margine ferrugineo.

ALÆ hyalino-fuſcæ.

VENTER niger.

PEDES toti ferruginei.

25. CHRYSOMELA FIMBRIATA.

Saltatoria oblonga, capite, thorace quadripunctato, elytriſque pallide teſtaceis, linea nigra cinctis, femoribus rufis.

Habitat in America Septentrionali.

MAGNITUDO & ſtatura prorſus chryſ. capreæ.

ANTENNÆ longæ fuſcæ, baſi pallidæ.

CAPUT teſtaceum puncto inter antennas impreſſo fuſco.

THORAX teſtaceus nitens, punctis quatuor & lineola longitudinali nigris.

ELYTRA pallide teſtacea; ſutura & linea prope marginem elytras ambiens nigra; ad apicem duo puncta minima nigra.

ALÆ fuſcæ.

ABDOMEN ſubtus rufum.

PECTUS piceum.

FEMORA omnia rufa, ultimi paris ſaltatoria incraſſata.

TIBIÆ fuſcæ.

TARSI omnes quatuor articulorum fuſci.

26. CHRYSOMELA HUDSONIAS.

Saltatoria, atra, oblongiuſcula, antennarum baſi ferrugineâ.

Habitat Noveboraci, in America Septentrionali.

Corpus magnitudine Chrys. *cyanellæ*, oblongiuſculum, totum aterrimum, nitens.

Antennæ fuſcæ, baſi ferrugineæ.

Plantæ Tibiæque fuſcæ.

27. CHRYSOMELA LATICLAVIA.

Cylindrica nigra, capite thorace elytriſque rufis, ſutura & margine elytrorum nigro, antennis ſerratis.

Habitat in Americâ Septentrionali.

MAGNITUDO Chryſ. ſericeæ.

ANTENNÆ baſi rufæ, articulis octo extimis nigris, ſerratis.

CAPUT rufum.

OCULI nigri.

PALPI nigri.

THORAX rufus, glaber, poſtice margo lateralis lineâ nigrâ.

ELYTRA rufa lineis nigris *latis* ad utrumque marginem, adque ſuturam; apice tamen non nigro.

ALÆ fuſcæ.

ABDOMEN ſubtus nigrum, pilis minutiſſimis cineraſcentibus veſtitum.

PEDES omnes nigri, poſtremi valde remoti.

FEMORA primi paris rufa, ſecundi picea,

TARSI quatuor articulis.

28. CHRYSOMELA CRATÆGI.

Oblonga rubra, elytris, linea longitudinali punctoque nigris.

Habitat in Anglia; lecta conſtanter in *Cratægo oxyacantha*, locis diſſitis.

CORPUS habitu & magnitudine proximum Chryſ. *nymphææ*, etiam valde affine Chryſ. *merdigeræ*; ſordide rubra ſunt caput, thorax, elytra, tibiæ, anus: nigra vero antennæ, oculi, ſcutellum, pectus, abdomen, femora, tarſi.

CAPUT ſordide rubrum, linea longitudinali nigrâ.

THORAX ruber, foveola impreſſa ad latus utrumque; & faſcia tranſverſalis nigra.

ELYTRA rubra, punctis minutiſſimis, excavatis fere contiguis conſita: in ſingulo, linea longitudinalis nigra, quæ neque baſin, neque apicem elytri attingit; ſuturam verſus, poſt hanc lineam punctum oblongiuſculum nigrum.

VARIETAS interdum reperitur pedibus totis rubris.

29. CHRYSOMELA TRIFURCATA.

Oblonga nigra, thorace elytriſque pallidis, elytris margine & ſutura, furca tridente, punctiſque octo nigris notatis.

Habitat in Americâ Septentrionali.

MAGNITUDO & habitus Chryſ. *flavipedis.*

ANTENNÆ pallidæ.

CAPUT nigrum.

THORAX anguſtatus pallidus.

ELYTRA pallida, notata furca tridente ad baſin, cujus dens medius ad ſuturam brevior, reliqui laterales non marginem adtingunt; puncta utrinque tria nigra in una ſerie diſpoſita, unum utrinque ad cuſpides laterales furcæ.

ABDOMEN ſubtus nigrum.

ALÆ fuſcæ.

PEDES pallidi.

FEMORA tibiæque poſticorum uſtulatæ.

TARSI omnis quatuor articulis.

30. CHRYSOMELA LEPTUROIDES.

Elongata, obſcure ænea, antennis plantiſque ferrugineis.

Habitat in provincia Noveboracenſi Americæ Septentrionalis.

CORPUS elongatum, totum æneum, magnitudine LEPTURÆ *melanuram* excedit.

ANTENNÆ & Palpi ferruginei.

THORAX ovatus.

ELYTRA elongata punctis rugoſa, obſcure ænea, margine læte virenti.

PEDES obſcure ænei, tarſis ferrugineis.

CUR-

CURCULIO.

31. CURCULIO ULICIS.

Longiroſtris femoribus ſimplicibus, cinereus, abdomine ovato, antennis, tarſis, tibiis omnibus & femoribus primi paris rufis.

Habitat in Anglia in floribus *Ulicis Europæi*, primo vere.

CORPUS ovatum, totum fuſcum & villis cinereis obſitum, vix pediculi magnitudine.

ANTENNÆ rufæ, roſtro ſubtus prope oculos inſertæ.

ROSTRUM atrum glaberrimum.

THORAX globoſus cinereus.

ELYTRA fuſca, ſtriata, cinereis villis veſtita, ſine ulla macula nigra.

FEMORA concolora, griſea.

TIBIÆ & tarſi cum femoribus primi paris rufi.

32. CURCULIO LONGIMANUS.

Longiroſtris femoribus dentatis, manibus longiſſimis.

Habitat in Anglia.

CORPUS oblongum, magnitudinæ Curcul. *pomorum*, piceum pilis cinereis tomentoſis nebuloſum.

ANTENNÆ rufæ.

ROSTRUM cum thorace longitudinem elytrorum æquat.

MANUS ſeu pedes primi paris tertia parte ad minimum reliquos pedes ſuperant.

ELYTRA cinerea punctis nigris ſparſis.

TARSI rufi.

33. CURCULO POLLINARIUS.

Longiroſtris, femoribus omnibus dentatis, elytris depreſſis planis abbreviatis, ventre, elytrorum margine & pedibus polline aſperſis.

Habitat in Angliæ plantis variis præſertim in *urtica dioica.*

CORPUS ſupra planum fuſcum, ſubtus ventricoſum polline griſeo conſitum.

ROSTRUM nigrum, retractile in foveolam pectoris inter pedes.

ANTENNÆ pedatæ, rufæ, inſertæ roſtro paululum ante apicem, articulo primo longiſſimo.

CAPUT retractile intra thoracem.

THORAX ſupra planus; linea longitudinalis in medio, ad latera puncta duo elevata ſeu ſpinæ.

ELYTRA ſupra plana, ad baſin anguloſa, apice obtuſa abbreviata nigro fuſca, uti caput & thorax.

VENTER, pedes & elytrorum margines aſperſi polline griſeo creberrimo; adeo ut ſupra ſit fuſcum, ſubtus griſeum inſectum; tactum roſtrum pedeſque contrahit ut vix a glebula terræ vel lapillo dignoſcas.

34. CURCULIO IMPERIALIS.

Breviroſtris ater, femoribus muticis, thoracis linea longitudinali, elytrorumque punctis per ſticas diſpoſitis viridi-inauratis.

Habitat ——— allatus in Angliam ex Olyſſipone, quo forte ex Braſilia advectus erat.

MAGNITUDO Scarabæi Melolonthæ.

ARTENNÆ nigræ clavatæ.

ROSTRUM breve, craſſum, ſtriatum, ſtriis duabus, villis viridi-ſericeis repletis.

CAPUT ſtriis tribus viridi piloſis, quarum duæ oculos includunt.

THORAX cylindricus, ſupra ater glaber, in medio linea longitudinali viridi-nitente exaratus; lateribus & in pectore viridi-inauratus, punctis elevatis glabris, atris rugoſus, colore viridi prevalente.

SCUTELLUM minimum viride.

ELYTRA nigra convexa gibba; puncta numeroſa excavata, viridi-ſericea inauratque, in fundo ſinguli puncti, puncto nigro, per ſtrias decem in quolibet elytro diſpoſita, punctis & ſtriis verſus futuram magis diſtantibus, at in lateribus confertis.

ABDOMEN totum uti pectus viridi-inauratum, punctis elevatis nigris, rugoſum.

PEDES nigri pilis viridibus adſperſi; tarſi dilatati ſubtus ferruginei.

35. CURCULIO NOVEBORACENSIS.

Breviroſtris muticus, canus, elytris ſubfaſtigiatis, ſtriis quinque albidis nigro punctatis, ſcutello flavicante.

Habitat in Americæ Septentrionalis provinciâ Noveboracenſi.

CORPUS totum fuſcum, pilis canis undique aſperſum; magnitudo e majoribus, vel $\frac{7}{10}$ unciæ pedis Anglicani longum.

ROSTRUM incraſſatum, medio linea longitudinali nigra.

OCULI fuſci, rufis pilis cincti.

ANTENNÆ ſubmoricliformes, articulis extremis in capitulum formatis.

THORAX canus, globoſo-cylindricus.

SCUTELLUM flavicans.

ELYTRA convexa, oblonga, apice ſubfaſtigiata, ſtriata quaſi punctis excavatis; faſciæ inter ſtrias circiter decem, alternæ albidæ puntis nigris.

PECTUS, Abdomen & Pedes cana.

TIBIÆ biſpinoſæ.

TARSI quadri-articulati, ſubtus pilis albidis veſtiti.

36. CURCULIO MELANOGRAMMUS.

Breviroſtris, femoribus muticis, corpore cano, ſuturâ elytrorum antice nigra, nitida, roſtro breviſſimo.

Habitat in Angliâ.

CORPUS dimidio minus Curcul. *incano*, totum undique nigricans, tectum granulis vel ſquamulis numeroſiſſimis caneſcentibus.

ROSTRUM vix ullum atrum nitens.

ANTENNÆ pedatæ, ruſeſcentes.

CAPUT & Thorax cinerea granulata.

ELYTRA ovata, valde convexa, cano nebuloſa, ſtriis circiter decem longitudinalibus e punctis excavatis. Linea dorſalis cuneiformis atra nitida a baſi, ad mediam fere ſuturam ducta, deſinens in angulum acutum.

PEDES ruſeſcentes.

CERAMBYX.

37. CERAMBYX BRUNNUS.

Thorace trispinoso, brunneus, elytris obtusis, striis duabus elevatis obscuris, antennis compressis brevioribus.

Drury illustr. t. 37. f. 1.

Habitat in America Septentrionali.

CORPUS magnitudine excedit Ceramb. *moschatum.*

MAXILLÆ atræ, magnæ.

PALPI picei.

ANTENNÆ breviores, piceæ, compressæ, undecim articulorum.

OCULI grandes.

THORAX brevis, piceus, antice & postice ciliatus pilis fulvis; spinæ tres acutissimæ in utroque latere.

SCUTELLUM brunneum, semiorbiculatum.

ELYTRA longa, obtusa, punctata brunnea, striis elevatis duabus vel tribus obscuris.

STERNUM fulvo corcineum.

PECTUS & Epigastrium brunnea, vestita pilis fulvis.

ABDOMEN nitens brunneum, incisurarum marginibus fulvis.

PEDES compressi brunnei.

TIBIÆ bispinosæ.

TARSI quadri-articulati, subtus pilis densis fulvis vestiti.

38. CERAMBYX INCANUS.

Thorace ſpinoſo, albus, elytrorum, faſciis duabus longitudinalibus fulvis, nigro-marginatis, antennis longioribus, ſubciliatis.

Habitat————————

MAGNITUDO Ceramb. lineati.

CORPUS totum nigrum, pilis albis minutiſſimis, confertiſſimis tectum.

ANTENNÆ, corpore longiores, nigræ, in medio ſinguli articuli caneſcentes; articulis tribus ſeu quatuor primis, (a baſi) ſubtus pilis tenuiſſimis rariſque ciliatis.

FRONS alba, cum linea nigra inter antennas ducta & puncto nigro ad utrumque latus hujus lineæ.

THORAX ſubrotundus niger, ſpina valida utrinque armatus, lineiſque duabus latis albis ornatus.

SCUTELLUM album.

ELYTRA alba, in quibus utrinque faſciæ ſeu lineæ latæ longitudinales fulvæ, nigro marginatæ; una ad marginem exteriorem, altera in medio ſinguli elytri; ambæ ante apicem definentes.

ABDOMEN album linea longitudinali nigra.

PEDES caneſcentes, patellis a baſi fulvis.

FEMORA ſubtus linea fulva.

PECTUS album, circa ſternum fulvum.

39. CERAMBYX CHINENSIS.

Thorace ſpinoſo, ater totus, elytris antice ſcabris punctis paucis albis ſparſis, antennis longioribus, ſingulo articulo baſi caneſcente.

Habitat in Chinâ.

CORPUS magnitudine & figurâ Ceramb. *Coriarii*, totum atrum.

ANTENNÆ nigræ, corpore longiores ſingulo articulo baſi caneſcente.

THORAX rotundatus, utrinque ſpina recta valida armatus.

ELYTRA ad baſin tantum punctis minutiſſimis ſubrotundis elevatis per ſtrias diſpoſitis, ſcabra. Puncta alba circiter decem ſparſa in ſingulo elytro.

PEDES atri.

TIBIÆ medio caneſcentes.

TARSI ſupra caneſcentes, ſubtus fuſci.

40. CERAMBYX PALLIATUS.

Thorace ſpinoſo, violaceus, elytris ſubfaſtigiatis a baſi ad medium fere teſtaceis, antennis brevibus, articulis quatuor clavatis.

Habitat in America Septentrionali.

CORPUS paullo minus Ceramb. *moſchato*, pilis minutis conſitum, coloris læte violacei, unde elegans animalculum.

CAPUT violaceum, punctatum, exſertum, canaliculo inter antennas notatum.

OCULI brunnei.

ANTENNÆ violaceæ, articulis undecim; quorum primus craſſus, ſecundus brevis globoſus, tertius longiuſculus clava magna, latera quaſi roſtrata, quartus, quintus & ſextus clavati, reliqui atri, extimo oblongo.

THORAX conus oblongus, violaceus, punctatus ad elytrorum baſin utrinque ſpina inſtructus.

ELYTRA ſub-faſtigiata, violacea, punctata, a baſi ad medium fere pallio veluti teſtaceo cincta, inferius margine undulato.

VENTER & Pedes violacei.

TIBIÆ biſpinoſæ.

TARSI 4 articulati, infra pilis fuſcis veſtiti.

41. CERAMBYX TETROPHTHALMUS.

Thorace mutico ſubcylindrico, corpore nigro-cineraſcente, capite, thorace, & elytris rubris nigro punctatis, oculis quatuor, antennis brevibus.

Habitat in Americæ Septentrionalis provinciâ Noveboracenſi.

MAGNITUDO fere Ceramb. *ſcalaris*.

CORPUS nigrum pilis albidis aſperſum, unde cineraſcens.

ANTENNÆ fuſcæ.

MAXILLÆ nigræ.

OCULI non ut in reliquis hujus generis lunati, ſed duo diſtincti ad utramque antennam, uno inferiore paullo majore, altero ſuperiore minore.

THORAX ſubcylindricus, ruber, punctis quatuor impreſſis nigris in medio orbiculum elevatum cingentibus: puncta duo elevata lateralia ad baſin, & margo poſticus nigra.

SCUTELLUM piloſum, nigrum.

ELYTRA rubra punctis nigris octo: duobus ad baſin elytrorum; quatuor in medio, horum exteriora majora; duobus verſus apicem, in quibuſdam etiam apex ipſe niger, obtuſus.

PEDES cineraſcentes, tarſis articulis quatuor.

42. CERAMBYX CLAVIPES.

Thorace globoso mutico, ferrugineo, corpore testaceo, capite nigro, femoribus clavatis, ustulatis, antennis hispidis mediocribus.

Habitat in Americâ Septentrionali.

MAGNITUDO Lepturæ *mysticæ*.

CAPUT nigrum.

LABIUM & *palpi* ferruginei.

ANTENNÆ mediocres pilosæ, ferrugineæ, pilis longioribus in extremitate articulorum.

THORAX muticus, globosus, ferrugineus.

ELYTRA linearia, testacea.

ALÆ fuscæ.

EPIGASTRIUM nigrum.

ABDOMEN & pedes ferruginea.

FEMORA clavata, ustulata, postremi paris longitudine Abdominis.

TIBIÆ bispinosæ pilosæ.

LEPTURA.

43. LEPTURA ROBINIÆ.

Thorace globoſo faſciato, nigra, elytris faſciis ſex flavis, tribus prioribus antrorſum arcuatis, poſticis undulatis.
Drury ill. t. 41. f. 2.

Habitat in *Robinia Pſeudacacia*, in provinciâ Noveboracenſi Americæ Septentrionalis.

MAGNITUDO Lepturæ *arcuatæ*.

CAPUT nigrum cinctum annulo flavo; macula flava inter antennas, medio nigra.

ANTENNÆ fuſcæ, elytrorum longitudine.

THORAX niger, annulis quatuor flavis.

ELYTRA nigra; faſciæ tres anteriores antrorſum arcuatæ flavæ, poſteriores duæ undulatæ; poſtrema ad apicem elytrorum; elytra ad ſuturam complanata, depreſſa.

PEDES ferruginei.

44. LEPTURA PILOSA.

Elytris fastigiatis, tota nigra, pilis cinerascentibus consita.

Habitat in Hispaniâ ad Calpen freti Gaditani.

MAGNITUDO circiter Lept. *mysticæ*.

CORPUS totum nigrum & undique pilis cinerascentibus crebris consitum.

ANTENNÆ articulis undecim.

OCULI brunnei.

THORAX globosus, dense pilosus, punctis excavatis conspersus.

ELYTRA apice fastigiata, margine exteriore circa humeros seu basin picea.

ABDOMEN & pedes ob densiores pilos, magis cinerascentia.

45. LEPTURA NITENS.

Thorace globoſo, abdomineque nigris, flaveſcenti-tomentoſis, nitentibus; elytris truncatis atris, faſciis quatuor, latis tranſverſis flavis; pedibus ferrugineis.

Habitat in Americâ Septentrionali.

MAGNITUDO Leptur. *melanuræ*.

Os ferrugineum cum palpis.

ANTENNÆ ferrugineæ, baſi fuſcæ.

CAPUT cum thorace globoſo, atque abdomine, nigra, adſperſa pilis flavo-aureis.

ELYTRA truncata; faſciæ quatuor flavæ, latæ, tranſverſæ, prima arcuata, circa marginem baſin elytri attingit, circa ſuturam non; reliquæ tranſverſæ; apex elytrorum niger.

ABDOMEN margine flavum.

PEDES omnes ferruginei.

NECYDALIS.

46. NECYDALIS COLLARIS.

Elytris subulatis atra, thorace bipunctato testaceo; pedibus simplicibus.

Habitat in Americâ Septentrionali.

CORPUS magnitudine Necyd. *cæruleæ*, totum excepto Thorace atrum.

THORAX cylindricus, testaceus, punctis duobus nigris.

PEDES antici picei, reliqui atri.

47. NECYDALIS CERAMBOIDES.

Elytris ſubulatis, viridi-ænea, pedibus ſimplicibus.

Habitat in Angliâ, lecta in lucis, in floribus *Leontodontis*.

MAGNITUDO & habitus Necyd. *cæruleæ*, ſed tota viridi-ænea.

ANTENNÆ nigræ.

THORAX ſubcylindricus, rugoſus.

ELYTRA ſubulata; linea longitudinalis in medio ſinguli elytri, elevata, deſinens ante apicem, inter hanc lineam & ſuturæ partem tertiam à baſi elytrorum, linea elevata altera.

ABDOMEN æneum politum.

PEDES nigri, femoribus ſimplicibus.

48. NECYDALIS MURALIS.

Elytris subulatis, fusca, humeris flavis, pedibus simplicibus.

Habitat in Angliâ frequens ad muros hortorum.

MAGNITUDO Lepturæ *melanuræ*.

THORAX subrotundus.

SCUTELLUM parvum fuscum.

ELYTRA subulata, abdomine breviora, basi flava, sive lutea.

PEDES fusci, femoribus simplicibus.

OBS. Hanc novam speciem debeo viro amicissimo *James Lee*.

LAM-

LAMPYRIS.

49. LAMPYRIS PILOSA.

Oblonga nigra, thorace sanguineo, lineis duabus longitudinalibus nigris, antennarum articulis tribus extimis pectinatis.

Habitat in America Septentrionali.

MAGNITUDO fere Lampyr. *noctilucæ*.

CAPUT inflexum pilosum, nigrum.

ANTENNÆ fuscæ; articuli tres extimi pectinati.

THORAX pilosus, sanguineus, lineis binis longitudinalibus nigris; margo exterior ad caput flavus.

ELYTRA dense pilosa, atra.

ABDOMEN subtus glabrum, atrum.

PEDES concolores.

CANTHARIS.

50. CANTHARIS AMERICANA.

Thorace marginato flavo, macula nigra, elytris flavis verſus apicem macula trientali oblonga nigra.

Habitat in Americæ Septentrionalis Noveboracenſi.

MAGNITUDO Canthar. *fuſcæ*.

CAPUT nigrum, margo oris rufeſcens, os acutum; palpi duo breviores, duo longiores.

ANTENNÆ fuſcæ, longitudine elytrorum, filiformes, articulis undecim.

THORAX a tergo planus, ſubquadratus, flavus, macula diſci nigra.

ELYTRA oblongo-linearia flava, flexilia; verſus apicem macula oblonga, nigra, trientalis, i. e. occupans tertiam partem elytrorum.

ABDOMEN nigrum, marginibus ſegmentorum flavis.

FEMORA nigra.

TIBIÆ tarſique duorum primorum parium rufeſcentes, poſteriorum nigræ.

BU-

BUPRESTIS.

51. BUPRESTIS FULIGINOSA.

Elytris integerrimis, ſublinearibus, glabris, piloſis; thorace deflexo, corpore fuliginoſo.

Habitat in Angliâ; lecta in floribus *Cratægi Oxyacanthæ.*

CORPUS magnitudine Canthar. *teſtaceæ*, totum fuliginoſum, nitens, undique piloſum.

ANTENNÆ moniliformes, articulis undecim.

THORAX deflexus.

ELYTRA ſublinearia, nec ſtriata nec punctata.

TARSI articulis quatuor.

DYTISCUS.

52. DYTISCUS LIVIDUS.

Antennis perfoliatis, capite, thorace, elytris, & pedibus lividis, ventre nigro.
Geoffr. pariſ. I. p. 184. *Hydrophilus* 5.

Habitat in *Lemna* in aquis ſtagnantibus Angliæ, Galliæ.

MAGNITUDO Scarab. *conſpurcati.*

ANTENNÆ perfoliatæ, clavatæ.

PALPI longiſſimi lividi.

CAPUT Thorax & Elytra livida.

ABDOMEN nigrum.

PEDES lividi, femoribus nigris.

TIBIÆ exterius ſerratæ, ſpinis duabus terminalibus.

53 DYTISCUS DERMESTOIDES.

Antennis perfoliatis, hæmiſphærico-ovatus, luridus, capite thoraceque nigris.

Habitat in Anglia inter *Lemnam* in aquis ſtagnantibus.

CORPUS fere Chryſom. *erythrocephalæ*, valde convexum, ovatum, totum luridum.

CAPUT atrum, nitidum.

THORAX ater, nitidus, margine pallido.

ELYTRA undique lurida, nullis punctis vel lineis nigris.

PEDES ferruginei, tibiis ſerratis, apice biſpinoſis.

54. DYTISCUS ATER.

Antennis ſetaceis, totus ater, antennis pedibuſque ferrugineis.

Habitat in Anglia, inter *Lemnam*, aquarum ſtagnantium.

CORPUS magnitudine Dytiſc. *minuti*, vel Dytiſc. *maculati*, ſed totum atrum.

ANTENNÆ filiformes, moniliformes, ferrugineæ ut et pedes.

55. DYTISCUS GLABER.

Antennis ſetaceis compreſſis, fuſcus, elytris glabris, ventre pedibuſque ferrugineis.

Habitat in Angliæ aquis ſtagnantibus.

MAGNITUDO DYTISCI *Striati*, cui admodum ſimile inſectum; tamen differt, ob characteres ſequentes:

ANTENNÆ compreſſæ, ferrugineæ, nec nigræ.

ELYTRA glabra, nec tranſverſim ſtriata.

PEDES omnes ferruginei, nec poſtici nigri.

ABDOMEN ferrugineum, nec nigrum.

56. DYTISCUS NEBULOSUS.

Lividus nigro-nebuloſus, antennis pedibuſque ferrugineis, ventre atro, margine ferrugineo.

Habitat in Angliæ aquis ſtagnantibus.

MAGNITUDO Dytiſci *uliginoſi*.

ANTENNÆ ſetaceæ.

ELYTRA livida, punctis minimis nigris nebuloſa.

ABDOMEN atrum, margine laterali ferrugineo.

57. DYTISCUS EXSOLETUS.

Antennis ſetaceis, lividus, antennis, capite, thorace, abdomine, pedibuſque pallidis.

Habitat in Angliæ aqua ſtagnante inter *Lemnam*.

MAGNITUDO fere Cimicis, Dytiſc. *maculatum* & *minutum* excedens.

CORPUS ovatum.

ELYTRA fuſca, margine pallido.

CARABUS.

58. CARABUS SERICEUS.

Alatus ater, capite, thorace & elytris viridi-nitentibus, antennis pedibusque rufis.

Habitat in America Septentrionali.

CORPUS magnitudine paullo Carab. *ſpinipedem.* ſuperat.

CAPUT viridi-ſericeum.

ANTENNÆ rufæ.

LABIUM ſuperius & palpi ferruginei.

OCULI nigri.

THORAX obcordatus, viridi ſericeus.

ELYTRA viridi-ſericea, ſtriis octo punctorum minutiſſimorum.

ALÆ albæ margine rufo.

ABDOMEN atrum.

PEDES omnes rufi.

TROCHANTERES ſeu appendices elongati ad femora poſtica, femoribus dimidio minores, rufi.

59. CARABUS LINEATUS.

Niger, thorace ferrugineo, elytris griſeis, ſuturæ linea communi, alteraque in ſinguli elytri medio nigra, ante apicem deſinente, pedibus griſeis, tarſis nigris.

Habitat in Americâ Septentrionali.

MAGNITUDO Carab. *Crux minor*.

CORPUS nigrum.

PALPI ferruginei.

ANTENNÆ albidæ.

THORAX obcordatus, ferrugineus.

ELYTRA albida, ſeu griſea, ſtriata; linea longitudinalis ſuturæ communis nigra; & in cujuſlibet elytri medio, linea alia longitudinalis nigra, nec baſin nec apicem adtingens.

ABDOMEN & epigaſtrium nigra.

PEDES albidi; geniculis, tibiiſque primi paris nigris.

TARSI omnes nigri.

TENEBRIO.

60. TENEBRIO UNCINUS.

Apterus niger, thorace marginato, ſubæquali, elytris ſtriato-punctatis, angulatiſque, femoribus anticis clavatis, maximis, biuncinatis.

Habitat in Hiſpaniâ.

MAGNITUDO Teneb. *mortiſagi*, ſed corpus gracilius & elytra reſpectu corporis breviora.

CORPUS totum atrum obſcurum.

ANTENNÆ longitudine thoracis, moniliformes.

CAPUT obovatum; inter oculos futura elevata retrorſum angulata.

THORAX antice, poſticeque ſubtruncatus, marginatus, planiuſculus, ſuborbiculatus, punctis minutiſſimis excavatis adſperſus.

SCUTELLUM minimum.

ELYTRA abdomen lateribus includentia, angulis vel ſtriis elevatis in ſingulo tribus, ante apicem in angulum acutum coëuntibus. Inter angulos, intervalla ſuperiora tria in utroque elytro ſtriis quatuor e punctis excavatis exarata, et lateralia ſtriis ſex.

FEMORA antica clavata, craſſiſſima, ad latus interius pro recipiendis tibiis excavata canaliculo, cujus margo uterque unco valido armatus.

61. TENEBRIO BUPARIUS *.

Alatus ater, glaber, thorace lunato, maxillis validis, dentatis, longitudine capitis.

Habitat in Hiſpaniâ ad fretum Gaditanum.

CORPUS magnitudine & ſtatura Lucani *interrupti*, & ad Lucanos referendum inſectum, niſi antennæ filiformes eſſent. Habitus Tenebrionis *foſſoris*.

CAPUT magnum, planum, quadratum, antice ſulcis duobus.

MAXILLÆ porrectæ, incurvæ, conniventes, angulatæ, bidentatæ.

ANTENNÆ filiformes, undecim articulorum, quorum primus ad baſin longior, craſſior, antennam pedatam efficit; reliqui pilis teſtaceis minutiſſimis rariſque adſperſi, ultimi ferruginei.

THORAX lunatus, marginatus, medio foſſula exaratus ut in Lucan. *interrupto*.

ELYTRA longitudine dimidii corporis, apicem verſus paullo latiora, rotundata, marginata, glaberrima, obſolete ſexſtriata.

PEDES primi paris in medio corporis poſitæ.

TIBIÆ antice dilatatæ, dentato-ſpinoſæ; poſteriores pilis ferrugineis ciliatæ.

TARSI articulis quinque.

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* Nomen ſpeciei, *buparius* derivatur a βοῦς et πάρειμι; quod *maxillo-ſum* denotat.

M E L O E.

62. MELOE CINEREUS.

Alatus cinereus, antennis elytrisque atris, margine cinereis.

Habitat in Americâ Septentrionali.

CORPUS magnitudine ad Meloen *Schæfferi*, statura vero & habitu ad Mel. *vesicatorium* accedit.

CAPUT inflexum, nigrum, pilis cinereis.

ANTENNÆ atræ, infra pilis ciliatæ, moniliformes, articulis undecim.

THORAX subrotundus, cinereus; macula nigricans in medio, divisa linea cinerea.

ELYTRA flexilia, atra, margine undique & ad futuram cinerea.

FEMORA tibiæque cinereæ, geniculis nigris.

TIBIÆ apice spinosæ.

TARSI atri in pedibus anterioribus quinque articulorum, in posterioribus quatuor.

VARIETATES minus cinereæ, et totæ nigræ, defectu pilorum cinerascentium e quibus color cinereus insecti ortus.

MOR-

MORDELLA.

63. MORDELLA TESTACEA.

Teſtacea, capite nigro, thorace fuſco.

Habitat in Angliâ; lecta in floribus *Cratægi Oxyacanthæ*.

MAGNITUDO fere Mord. aculeatæ.

CAPUT nigrum.

ANTENNÆ teſtaceæ.

THORAX fuſcus, vel magis obſcure teſtaceus.

ELYTRA, Abdomen, & Pedes teſtacea.

64. MORDELLA MELANOPA.

Nigra, elytris, thorace, capite pedibusque testaceis.

Habitat cum precedente.

MAGNITUDO majoris pediculi.

CORPUS supra et artubus testaceum, subtus nigrum.

ANTENNÆ apice fuscæ.

OCULI atri.

ELYTRA testacea; punctum fuscum in medio, & aliud ad basin futuræ, in singulo elytro.

PEDES testacei.

65. MORDELLA FASCIATA.

Atra, elytris teſtaceis, apice nigris, faſciaque nigra in medio.

Habitat in Angliâ; frequens in floribus *Cratægi*, *Rumicis* & *Umbellatarum*.

MAGNITUDO præcedentis, vel paullo minor.

ANTENNÆ fuſcæ, baſi teſtaceæ.

THORAX niger, adſperſus villis breviſſimis, fuſco-teſtaceis, non niſi oculo armato conſpicuis.

ELYTRA teſtacea; in medio faſcia tranſverſa nigra, alia ad apicem.

ABDOMEN nigrum, pallidius verſus apicem, & acutum, ut fere aculeatum.

PEDES fuſci.

66. MORDELLA CLAVICORNIS.

Picea tota, antennis clavatis.

Habitat in Angliâ, curſitans in floribus *Rhei-Rhabarbari*.

CORPUS ovatum, magnitudine Mord. *thoracicæ*, vel paullo majus.

ANTENNÆ fuſcæ, baſi ferrugineæ clavatæ.

Os ferrugineum.

THORAX hemiſphæricus, major quam in congeneribus, pilis minutiſſimis pallentibus conſitus.

ELYTRA picea, æque piloſa; linea obſcura longitudinalis ad ſuturam.

PEDES concolores.

II. HEMIPTERA.

CICADA.

67. CICADA. CARINATA.

Thorace dilatato, carinato, connato, corpus totum & elytras includente, alarum margine coriaceo.

Habitat in Americæ Septentrionalis provinciâ Noveboracenſi.

MAGNITUDO $\frac{1}{5}$ unciæ ſ. pollicis Anglicani.

ANTENNÆ ſetaceæ, albæ, duorum articulorum, longitudine capitis.

OCULI pallide fuſci.

CLYPEUS capitis dilatatus ferrugineo-fuſcus, adſperſus foveolis, in quorum fundo ſunt globuli diaphani rubicundi; foveolæ, globulique iidem adſunt in thorace & in margine alarum.

THORAX dilatatus, gibbus, venoſus, ſcaber, carinam efficit acutiſſimam quaſi ex elytris connatam, totum corpus includentem; faſcia tranſverſa obliqua a dorſi medio, apicem verſus deſcendit.

ELYTRA nulla.

ALÆ venoſæ, hyalinæ, margine coriaceo.

ABDOMEN & Femora nigra.

TIBIÆ pallidæ, ut et Tarſi, triarticulati.

68. CICADA GUTTATA.

Saltatoria fuſco-varia; capite, thorace, elytriſque ferrugineis punctis flavis albiſque, tergo coccineo.

Habitat in Americâ Septentrionali.

MAGNITUDO Cicad. *Spumariæ.*

FRONS rubicunda, nigro-maculata.

ANTENNÆ fuſcæ.

CAPUT & Thorax fuſco-ferruginea, punctis crebris albidis.

ELYTRA fuſco-ferruginea, punctis albidis adſperſa, ad marginem punctis majoribus flavis.

ALÆ fuſcæ.

TERGUM coccineum.

ABDOMEN albo fuſcoque varium.

PEDES ferruginei.

69. CICADA coccinea.

Alis deflexis, flava; capite, thorace, ſcutello, tergo, elytriſque coccineis, elytris lineis duabus longitudinalibus obliquis virentibus.

Habitat in Americâ Septentrionali.

Magnitudo circiter Cicad. *flavæ*.

Frons flava margine nigro.

Antennæ fuſcæ, baſi flavæ.

Caput coccineo-rubellum.

Thorax coccineus margine & linea longitudinali viridi.

Scutellum coccineum.

Elytra coccinea; undique margine viridi, lineiſque duabus obliquis longitudinalibus, ſecunda interrupta, viridibus.

Tergum coccineum.

Abdomen pedeſque flava.

NOTO-

NOTONECTA.

70. NOTONECTA LINEATA.

Pallide flava, elytris concoloribus; maculis nebulosis fuscis tribus longitudinalibus.

Habitat in aquis provinciæ Noveboracensis in America Septentrionali.

MAGNITUDO $\frac{1}{6}$ pollicis s. unciæ Anglicanæ.

ANTENNÆ parvæ sub capite, pone oculos, duorum articulorum, extimo clavato.

CAPUT obtusum, flavum.

OCULI brunnei.

THORAX flavus, lineis tribus transversis fuscis.

ELYTRA flexilia flava, punctis nebulosis fuscis, in lineas tres longitudinales digestis.

ALÆ inferiores albæ, pellucidæ.

ABDOMEN, Pedes, & Pectus pallide flava.

CIMEX.

71. CIMEX ATERRIMUS.

Ovatus, ater totus, elytris dimidiato-hyalinis.

Habitat in Hiſpaniâ ad fretum Gaditanum.

CORPUS magnitudine Cim. *ornati*, ovatum, totum aterrimum glabrum.

CLYPEUS capitis emarginatus.

ANTENNÆ apice fuſcæ.

THORAX antice parum depreſſus, retuſus.

SCUTELLUM triangulare acutum.

ELYTRA antice atra, a medio vero ad apicem flaveſcenti-hyalina; pars nigra ab hyalina margine undulato diſtincta, ut quaſi præmorſa adpareant elytra.

ALÆ hyalinæ.

PEDES atri, pilis vel ſetis brevibus, rigidis, atris, ciliati.

72. CIMEX CARINATUS.

Roſtro arcuato, antennis capillaribus, thorace compreſſo carinato, carina ſerratâ.

Habitat———

CORPUS duplo majus Cim. *perſonato*, ſubtus nigrum.

ANTENNÆ quatuor articulorum, rufæ.

ROSTRUM arcuatum, validum, rufum, apice nigro.

CAPUT poſtice attenuatum, ſpinis duabus poſt antennas & tuberculis totidem inter oculos.

THORAX rhombeus, lateribus dilatatus, medio ſurſum compreſſus, carinatus; margine, apiceque carinæ ſerratis; ſpinæ duæ ad collum.

ELYTRA fuſca, apice fuſco-virentia.

PEDES rufi.

FEMORA nigra, primi paris baſi rubra.

SPIRACULA rubra.

III. LEPIDOPTERA.

PAPILIO.

73. PAPILIO NAIS.

N. P. alis dentatis, ſupra fulvis, primoribus faſcia maculiſque nigris, poſticis punctis nigris ſex.

Habitat in Bombay Indiæ orientalis.

CORPUS quartæ magnitudinis, fulvo-rubrum.

ANTENNÆ———

PALPI albi, rubicundi.

OCULI brunnei.

PEDES ſex albi, quorum duo breviſſimi, rubicundi.

ALÆ *primores ſupra* concolores fulvæ. Margo exterior niger, lunulis albis; ſupra hunc marginem faſcia nigra, at marginem tenuiorem non attingens; ad craſſiorem duæ maculæ nigræ, quarum ſuperior reniformis, maculis in ea rubris minimis. Alia macula nigra in medio diſci.

—— *ſubtus* fuſcæ rubentes, maculis albis 4 ad apicem, & faſcia fuſca ad marginem exteriorem; ad craſſiorem, maculæ binæ nigræ, rubro maculatæ; in diſco macula nigra.

—— *inferiores ſupra* fulvæ margine nigro, punctis albis; puncta ſex nigra ſupra hunc marginem: *ſubtus* fuſcæ rubentes, faſcia media tranſverſa alba, punctis ſex nigris ad marginem; puncta duo pulcre rubra ad baſin nigro cincta.

PHALÆNA.

74. PHALÆNA MURALIS.

Noctua ſpirilinguis ſubcriſtata, alis ſupra albidis; faſcia undata, ſtigmate in medio alæ, macula & faſcia altera ad baſin vireſcentibus, nigro fimbriatis.

Habitat in Angliâ, larva victitat inter *Lichenem parietinum* & *ſaxatilem* & inde loculum pro chryſalide conſtruit.

CORPUS facie Ph. *Aceris* ſed minus, albidum, criſta nigro-marginata.

ANTENNÆ fuſcæ.

OCULI nigri.

PALPI erecti, incurvati albi, baſi nigri.

ABDOMEN albidum, ſerie punctorum nigrorum a tergo.

ALÆ *ſuperiores ſupra* albidæ, faſcia vireſcente undata, nigro fimbriata ad baſin, connexa maculæ concolori interruptæ, marginem exteriorem non tangente. *Stigma* virens in medio alæ, paululum a margine exteriore remotum. Ad marginem inferiorem faſcia lata vireſcens undata, lituris nigris incluſa. Margo exterior nigro-punctatus, ſic et inferior ciliis nigro punctatis.—*Subtus* fuſco nebuloſæ.

—— *inferiores ſupra* albidæ, faſcia obſcure fuſca ad marginem inferiorem. *Subtus* concolores, cum puncto obſcuro fuſco in medio alæ.

PEDES albi, nigro annulati.

75. PHALÆNA miniata.

Geometra ſeticornis, alis rotundatis, omnibus pallide miniatis, anticis linea undata ad baſin, characteribus in medio, & punctis verſus marginem poſticum nigris.
Harris inſ. t. 30. f. *p.*

Habitat in quercetis Angliæ.

Magnitudo Ph. *marginatæ.*

Antennæ pallide rubræ.

Corpus pallide rubrum.

Oculi nigri.

Alæ *ſuperiores* pallide rubræ, vel miniatæ, linea undulata prope baſin nigra; margo exterior uſque ad hanc lineam itidem niger. Poſtice characteres confertiſſime & acute undulati, nigri; punctaque nigra ſub ſingulo denticulo vel angulo hujus characteris. *Subtus* pallidiores, macula coſtali nigra, oppoſita parti nigræ marginis exterioris, in pagina ſuperiore; verſus apicem macula palmata nigra reſpondens maculæ undulatæ in pagina ſuperiore.

—— *inferiores* magis obſcuræ rubræ: *ſubtus* fuſco-rubræ.

Abdomen ſubtus nigrum.

Pedes pallide-rubri, geniculis nigris.

76. PHALÆNA FULVATA.

Geometra feticornis, alis rotundatis, anticis fulvis, fascià ad basin, aliaque in medio undato repanda, ferrugineo-rufâ.

Habitat in Angliæ *Cratægo oxyacantha.*

CORPUS magnitudine præcedentis.

ANTENNÆ albido-flavescentes.

OCULI fusci.

PALPI fulvi.

CAPUT & Thorax fulva.

ABDOMEN pallide flavum.

ALÆ *superiores* fulvæ; fascia ad basin & in medio ferruginea; macula trigona pallida versus apicem. *Subtus* pallide flavæ.

—— *posticæ* supra & infra ex albido flavescentes: *subtus* in medio puncto obscuro fusco.

PEDES pallide flavi.

IV. HYMENOPTERA.

CYNIPS.

77. CYNIPS SERICEA.

Viridi-nitens, pedibus totis flavis antennis fuscis. *Geoffr. paris.* I. p. 301. *Cynips* 12.

Habitat in gallis foliorum quercus deciduorum; mense Januario lecta in principatu *Walliæ* in Angliâ. 1769 & 1770.

CORPUS Cynip. vel Ichneum. *Bedeguaris* minus, totum viridi sericeum.

ALÆ hyalinæ; costâ, lituraque minima costali, pallidis.

ABDOMEN oblongum, acutum ad anum.

FEMORA, tibiæ, plantæque pallide flava.

TENTHREDO.

78. TENTHREDO CYANO-CROCEA.

Antennis clavato-filiformibus, exarticulatis, capite thoraceque cyaneis, abdomine croceo.

Habitat in plantis umbellatis Angliæ.

MAGNITUDO Tenthred. *Salicis*.

ANTENNÆ exarticulatæ, prismaticæ, nigræ, sursum erectæ, plerisque ciliatæ.

CAPUT & *Thorax* cyanea nitida.

ALÆ hyalinæ, cum fascia fusca a puncto nigro.

ABDOMEN croceum.

FEMORA primi & secundi paris pedum violacea, tertii paris flava; patellâ & apice violaceis.

TIBIÆ Primi paris fuscæ; secundi & tertii paris luteæ; apicibus nigris.

TARSI fusci.

79. TENTHREDO ARCUATA.

Antennis subclavatis, abdomine nigro, arcubus quinque, fascia ad basin, lateribusque flavo-virentibus.

Habitat in Angliâ.

MAGNITUDO Tenthred. *bicinctæ*, vel paullo minor.

ANTENNÆ subclavatæ, atræ, septem articulis, quinque extimis majoribus; bases antennarum latere interiore flavæ.

LABIUM flavum.

THORAX ater, lineâ flavâ a capite ad basin alarum, in maculam flavam desinente.

PECTUS flavo-maculatum.

SCUTELLUM flavum & postice ad ejus latera puncta duo minima flava.

ALÆ hyalinæ, costa fusca, punctoque costali ferrugineo.

ABDOMEN nigrum, lateribus flavo-virentibus: ad basin fascia flavo-virens; segmento uno interjecto, reliqua margine arcubus flavo-virentibus cincta, supra, infraque.

PEDES flavo-virentes.

FEMORA linea longitudinali ad latus exterius nigra.

TIBIÆ apice nigræ.

TARSI supra fusci.

80. TENTHREDO ATRATA.

Antennis ſubclavatis exarticulatis, corpore atro, dorſo cingulo & arcubus tribus flaveſcenti-virentibus.

Habitat in Angliâ.

MAGNITUDINE paullulum ſuperat Tenthred. *uſtulatam*.

ANTENNÆ ſubclavatæ, ſubtus ſtria elevata longitudinali.

ALÆ ferrugineæ, macula fuſca oblonga, ſecundum coſtam uſque ad apicem alarum protenſa.

ABDOMEN ſub ſcutello cingulo flavo-virenti; interjecto uno ſegmento ſequuntur tria arcubus marginum flavo-virentibus.

FEMORA atra, geniculis flavis.

TIBIÆ & plantæ flavæ.

UNGUICULÆ fuſcæ.

ICHNEUMON.

81. ICHNEUMON PRIMATORIUS.

Niger, ſcutello flavicante, antennis albo-annulatis, thorace maculato, abdominis ſegmento ſecundo & tertio ferrugineo, reliquis nigris, ultimis albo-maculatis.

Habitat in Angliâ; unicum tantum ſpecimen a me lectum ad ſepes.

MAGNITUDO Ichneum. *Piſorii* vel major; ſimillimus Ichneum. *ſarcitorio*, ſed triplo major, abſque linea tranſverſa nigra, inter ſegmenta abdominis ferruginea.

CAPUT totum atrum.

ANTENNÆ nigræ, annulo albo.

THORAX niger, macula albida ante alas primores.

SCUTELLUM albidum.

ABDOMEN petiolo nigro; ſegmenta petiolo proxima ferruginea, reliqua nigra: puncta ſeu maculæ albæ ſingulæ in ſegmentis tribus ultimis.

ALÆ hyalinæ, coſta fuſcâ.

PEDES ferruginei, ſed femora nigra, quorum poſtica et media macula alba ad baſin ornata.

82. ICHNEUMON ARMATORIUS.

Niger, ſcutello flavo, antennis nigris, ſubtus rufis; thorace utrinque ſpinâ armato; abdomine nigro cingulis binis, anoque flavis.

Habitat in Angliâ.

MAGNITUDO Ichn. *luctatorii*.

CAPUT nigrum, fronte labioque flavis.

ANTENNÆ nigræ, fere totum corpus longitudine æquantes ſubtus rufæ, baſi vel infimo articulo ſubtus flavæ.

THORAX niger, punctis duobus vel tribus ad baſin alarum flavis; ſpina ad utrumque latus thoracis poſtice, abdomen ſpectans.

SCUTELLUM flavum.

ABDOMEN petiolatum, longum, compreſſum, ſegmento ſecundo tertioque antice dimidiato-flavis; ſubtus ſegmenta 2, 3, 4, flava, ſed quartum puncto utrinque nigro.

ANUS flavus.

PEDES primi & ſecundi paris toti lutei, at in femoribus maculæ longitudinales nigræ.

FEMORA poſtica nigra, baſi flava.

TIBIÆ poſticæ flavæ, apice nigræ.

PLANTÆ poſticæ ferrugineæ.

ALÆ rufæ, venis rufis.

83 ICHNEUMON XANTHORIUS.

Niger, ſcutello flavo, antennis annulo flavo cinctis; thorace maculato, abdomine petiolato flavo-annulato, pedibus flavis, femoribus nigris.

Habitat in Angliâ.

MAGNITUDO Ichn. *extenſorii* vel paullo major.

CAPUT nigrum, lineola flava ante oculos.

PALPI ferruginei.

ANTENNÆ baſi flavæ, dein rufæ, medio flavicantes apice nigræ.

THORAX niger, callo flavo ante, et altero pone alas primores.

SCUTELLUM flavum.

ALÆ rufeſcentes; coſta primorum, puncto que luteis.

ABDOMEN petiolo nigro, apice flavo; ſegmenta nigra, ſed margines faſciis latis flavis ornati.

FEMORA primi & ſecundi paris pedum nigra, exceptis genubus flavis; poſtica tota nigra, puncto majore flavo ad baſin.

TIBIÆ flavæ, poſticæ apice nigræ.

TARSI flavi.

84. ICHNEUMON ATRATOR.

Niger totus, ſcutello concolore, antennis nigris albo cinctis; pedibus rufis, plantis poſticis apice albis.

Habitat in Angliâ.

CORPUS magnitudine Ichn. *extenſorii*, nigrum totum, moſchum redolens.

ANTENNÆ annulo albo cinctæ.

ALÆ fuſceſcentes.

ABDOMEN falcatum, atrum aculeo breviſſimo.

PEDES ferruginei, poſtici plantis apice albis.

PATELLÆ, (ſive baſes elevatæ mobiles, quibus femora inſident,) in pedibus poſticis maximæ, atræ.

85. ICHNEUMON POLYZONIAS.

Ater, antennis luteis, capite, thorace, pectoreque flavo maculatis; ſcutello flavo, abdomine atro, marginibus ſegmentorum flavis.

Habitat in Angliâ.

MAGNITUDO Ichneum. *extenſorii.*

ANTENNÆ ferrugineæ ſeu luteæ, baſi & apice fuſceſcentes; baſis antennarum ſubtus flava.

CAPUT nigrum; linea circum oculos, macula frontis, & labium flava.

THORAX ater; maculæ ante alas, ſub alis & ſupra pedes ſecundi paris flavæ.

SCUTELLUM flavum.

ALÆ hyalino-ferrugineæ, macula coſtali pallida.

ABDOMEN ſubtus compreſſum & carinatum, marginibus ſegmentorum ſupra infraque flavis.

PEDES ferruginei; tibiæ anticæ, femorumque apices flava.

PATELLÆ femorum poſticorum ovatæ, nigræ.

SPHEX.

86. SPHEX xanthocephala.

Nigra, fronte flavâ, abdomine ſubſeſſili, pedibuſque flavo maculatis.

Habitat in Angliâ.

Magnitudo Sphegis *cribrariæ*.

Caput nigrum, fronte macula magna flava, poſticetrifida.

Antennæ longitudine thoracis nigræ, articulo infimo flavo.

Thorax niger, puncto flavo ante alas.

Alæ hyalinæ, apice fuſcescentes.

Abdomen nigrum; margines ſegmentorum 2, 3, 4, 5, 6, faſciis flavis cincti, ſubtus puncta flava utrinque duo.

Pedes flavi, genubus nigris, tarſis fuſcis.

87. SPHEX SPINOSA.

Atra, abdomine subsessili, thorace postice utrinque spina instructo, labio pectoreque argenteis.

Habitat in Angliâ.

MAGNITUDO Apis *rufipedis*.

CORPUS atrum, absque pilis.

ANTENNÆ nigræ.

CAPUT nigrum, ore seu labio argenteo.

THORAX niger rugosus, postice utrinque spina brevi armatus; antice lineola flava ornatus.

PECTUS, inter pedes primi & secundi paris, fascia argenteo-plumbea cinctum.

ALÆ hyalinæ.

ABDOMEN nigrum subsessile, gleberrimum, supra fasciis tribus flavis, prima interrupta, a reliquis remota.

PEDES rufi, femoribus ad exortum nigris.

CHRYSIS.

88. CHRYSIS CYANOCHRYSA.

Glabra nitens, capite thoraceque cyaneis, reliquis viridi-aureis, ano quadridentato.

Habitat in Hiſpaniâ ad Calpen freti Gaditani.

MAGNITUDO parum inferior Chryſid. *ignita*.

CAPUT cyaneum.

LABIUM ſuperius & regio inter oculos veſtita pilis raris griſeis.

ANTENNÆ fuſcæ, articulis duobus ultimis, ad baſin cyaneis.

THORAX ſcabriuſculus punctatus cyaneus, ſub alis verſus abdomen utrimque dentes ſinguli.

ALÆ fuſcæ, coſta veniſque nigris.

ABDOMEN viridi-aureum, ano quadridentato.

VENTER concavus nitens, coloris beryllini.

PEDES femoribus cyaneis, tibiis beryllinis, tarſis fuſcis.

89. CHRYSIS CYANURA.

Glabra nitens, ſmaragdina, thorace bidentato, abdomine concolore, quadridentato.

Habitat in Hiſpaniâ ad Calpen freti Gaditani.

CORPUS magnitudine æquat maximas inter Chryſid. *ignitas*, totum nitens, colorem ſmaragdinum imitatur.

ANTENNÆ nigræ totis ultimis duobus articulis & quibuſdam reliquorum ſupra nitentibus.

OCULI magni purpureo-fuſci.

THORAX linea capiti parallela tranſverſim diviſus, dein medium thoracis diviſum in areolas tres lineis longitudinalibus.

SCUTELLI loco, duo dentes; ſub alis verſus abdomen utrinque dentes ſinguli.

ABDOMEN undique nitens viride, duo extrema ad apicem ſegmenta cyanea; anus quadridentatus.

ALÆ fuſcæ; coſta alarum, venæque nigræ.

PEDES nitentes; tarſis fuſcis.

V E S P A.

90. VESPA RUFICORNIS.

Nigra, thorace hirto, antennis aliſque rufeſcentibus; abdomine faſciis quinque interruptis flavis.

Habitat in Hiſpaniâ ad fretum Gaditanum

MAGNITUDO V. *vulgaris.*

CAPUT nigrum maxillis flavis, palpis ferrugineis, roſtro vel linguâ nigra: *frons* flava, macula nigra verſus antennas haſtata; pone oculos lunula ruſa.

ANTENNÆ ferrugineæ, baſi flavæ: ad ſtemma primum puncta duo flava, in quolibet latere unum.

THORAX niger, pilis flavis adſperſus; antice macula vel linea ſinuata flava cingitur; ad alarum baſin punctum lineare flavum; ad horum punctorum extremitates macula tranſverſa flava in thorace loco ſcutelli, ac pone hanc maculam ſulci tranſverſi bini.

ALÆ baſi rufæ, apice fuſceſcentes, venis ferrugineis.

ABDOMEN glabrum, ſeſſile, atrum, in quolibet ſegmento maculæ binæ oblongæ flavæ, anuſque flavus: ſubtus ſegmenta tria vel quatuor ultima ſimiliter maculis magnis (in ſingulo duabus) ornata.

FEMORA baſi nigra apice flava.

TIBIÆ apice ſpinoſæ, flavæ.

TARSI flavo-rufeſcentes, primi paris extrorſum ciliati.

A P I S.

91. APIS SERICEA.

Capite, thoraceque viridi-nitente; abdomine nigro, faſciis quinque, pedibuſque flavis.

Habitat in Americâ Septentrionali.

MAGNITUDO & facies Chryſid. *ignitæ*.

LABIUM ſuperius & maxillæ flavæ.

LINGUA nigra, longitudine capitis.

ANTENNÆ nodoſæ, ſupra ſuſcæ, infra flavæ.

CAPUT viride nitens.

OCULI fuſci.

THORAX viridi-aureus.

ABDOMEN ovatum, nigrum, faſciis quinque flavis.

PEDES omnes flavi.

FEMORA poſtica dente parvo.

ALÆ fuſcæ hyalinæ.

92. APIS VESPIFORMIS.

Nigra, antennis, ore, maxillis, pedibus, & alis ferrugineis ; thorace punctis abdomine faſciis quinque flavis, primis interruptis.

Schæffer. ic. inſ. ratiſb. t. 53. f. 11. & t. 81. f. 7.

Habitat in Americâ ſeptentrionali & Germaniâ.

CORPUS nigrum, magnitudine Apis *mellificæ*, facie veſpæ.

MAXILLÆ ferrugineæ apice fuſcæ.

LINGUA ferruginea.

ANTENNÆ nodoſæ ferrugineæ.

THORAX puncto ferrugineo utrinque ad collum, ad callum alæ, ſub ala, in ſcutello, & unico ſub ſcutello.

ABDOMEN faſciis quinque flavis ; quarum duæ, proximæ thoraci, interruptæ.

ALÆ ferrugineæ.

PEDES ferrugineo-flavi.

93. APIS NOVEBORACENSIS.

Atra, ſubvilloſa, alis atro-cæruleſcentibus, abdominis ſegmento ſecundo & tertio faſcia flava.

Habitat in Americæ Septentrionalis provinciâ Noveboracenſi.

MAGNITUDO veſpæ *vulgaris*, tota atra, ſubvilloſa.

LINGUA brevis ferruginea.

ANTENNÆ atræ nodoſæ.

ABDOMINIS ſegmentum ſecundum & tertium ſuperiori parte faſcia flava.

ALÆ atro-cæruleæ.

TARSI poſtici ſpinis ferrugineis.

TIBIÆ anticæ ſpina incurva ferruginea.

Drury illuſtr. t. 44. f. 5. videtur eſſe varietas faſciis quatuor flavis, & capite flaveſcente.

94. APIS ALBIFRONS.

Atra pubeſcens, fronte, thorace, tibiis, punctiſque in abdomine albis.
Schæff. ic. t. 22. f. 14.

Habitat in Angliâ, ad fretum Gaditanum in Hiſpaniâ, & in Germaniâ.

MAGNITUDO Ap. *Tumulorum.*

FRONS truncata; circa baſin antennarum pili albi.

ANTENNÆ craſſiuſculæ.

THORAX antice & lateribus pilis denſis albis tectus; ſub alis punctum album; in poſtica parte thoracis & inter alas pili nigri.

ABDOMEN ſegmento primo antice pilis albis tecto, latera ſegmentorum 2, 3, 4, punctis utrinque ſingulis albis.

TIBIÆ in ſuperiori parte pilis albis adſperſæ & in apice ſpinoſæ.

ALÆ hyalino-fuſcæ, venis nigris; margine exteriore punctis crebris nigris.

V. DIPTERA.

MUSCA.

95. MUSCA CHALYBATA.

Antennis filatis, clavatis, ſcutello ſexdentato, thorace chalybato, abdomine atro.

Habitat in Angliâ, lecta vere.

MAGNITUDO Muſc. *clavipedis*.

ALÆ nigræ.

THORAX nitidus, cæruleo-ater.

SCUTELLUM dentibus ſex, tribus utrinque, quorum duo extimi minimi.

HALTERES nigri.

ABDOMEN atrum.

PEDES teſtacei, poſtici elongati, plantis nigris dilatato-clavatis.

96. MUSCA VALLATA.

Antennis filatis, clavatis, ſcutello ſexdentato, abdomine femoribuſque flavis.

Habitat ad Sepes in Angliâ.

MAGNITUDO præcedentis, vel paullo major.

ALÆ ſubferrugineæ, incumbentes, planæ, puncto fuſco in medio coſtæ.

THORAX nitidus ater.

SCUTELLUM dentibus ſex.

HALTERES flavi.

TIBIÆ apicem verſus fuſcæ.

TARSI fuſci.

97. MUSCA SIMILIS.

Antennis filatis, clavatis, ſcutello viridi-cæruleo nitido, ſexdentato, abdomine chalybato.

Habitat in Angliâ; circa ſolſtitium lecta.

CORPUS magnitudine præcedentium.

ALÆ ſubferrugineæ, puncto fuſco ad alas.

PEDES omnes nigri.

THORAX nitidus, viridi cæruleus.

ABDOMEN cæruleo-atrum.

SCUTELLUM ſex dentibus.

HALTERES albi.

OBS. Hæ tres muſcæ & M. *clavipes* Linnæi, valde ſimiles & inter ſe affines; ſed tamen ſunt diverſæ, nam 1. M. CLAVIPES habet *abdomen* flavum, alas nigras, *halteres* flavos *femora* flava, *tarſorum* articulum primum elongatum clavatum; at nulla reliquarum eoſdem omnes habet characteres. 2. M. VALLATA habet *abdomen* flavum; ſed *alæ* ſubferrugineæ ſunt, & *tarſi* ſimplices. 3. M. CHALYBATA habet quidem *alas* nigras & tarſos clavatos; ſed *Thorax* eſt chalybatus & *abdomen* atrum ut et *halteres*. 4. M. SIMILIS habet *pedes* ſimplices, *alas* ſubferrugineas, *halteres* albos, *thoracem* viridi cæruleum, nitidum & abdomen chalybatum; adeo ut ſatis ſint ab invicem diſtinctæ.

98. MUSCA MELANOPYRRHA.

Antennis plumatis, tomentoſa nigra, abdominis apice rufo.

Schæff. ic. inſ. ratiſb. t. 10. f. 6.

Habitat in Angliâ, & Germaniâ.

MAGNITUDO Muſc. *pellucentis*.

FRONS pallida.

OCULI approximati, nigri.

PILI pauci flavi, circa ſtemmata.

THORAX hirſutus niger.

ABDOMEN, hirſutum nigrum, apice hirſutum rubrum, ſubtus atrum.

SCUTELLUM olivaceum.

ALÆ baſi nervis fulvis, in medio macula magna fuſca.

99. MUSCA GRANDITARSA.

Antennis, ſetariis, glabra, thorace nigro-æneo, abdomine ferrugineo apice nigro.

Habitat ad ſepes in Angliâ.

HABITUS & fere magnitudo Muſc. *ſegnis* cui ſimillima.

THORAX nigro-æneo-virens.

ABDOMEN oblongum, ferrugineum; duo ultima ſegmenta nigra.

FEMORA omnia nigra, ſimplicia.

TIBIÆ ad baſin & femora ad genua ferruginea in pedibus quatuor anterioribus.

TARSI nigri; articuli primi tarſi primi & ſecundi paris pedum, grandes, cum pollice; at articulus primus, tarſi pedum poſticorum, grandis abſque pollice.

ALÆ ſubfulvæ.

HALTERES albi.

TABANUS.

100. TABANUS AMERICANUS.

Oculis———, plumbeus, abdominis segmentis versus latera albicantibus, alis hyalinis, costa ferruginea, pedibus ferrugineo-fuscis.
Drury ill. t. 44. f. 2. 3.

Habitat in Virginiâ & provinciâ Noveboracensi, Americæ septentrionalis.

MAGNITUDO e maximis congenerum, unciam unam pedis Anglicani longitudine exæquat.

PROBOSCIS nigra, capitis longitudine, palpis ferrugineis.

FRONS & cetera capitis alba, pilosa.

ANTENNÆ lunatæ ferrugineæ.

OCULI———magni.

STEMMATA nulla conspicua nisi locum eorum occupat punctum magnum nitidum excurrens in lineam nitidam angustam inter oculos.

THORAX plumbeus, vix pilosus; subtus pectus totum consitum pilis albidis longioribus.

ABDOMEN utrimque coloris plumbei, segmentis septem, quorum quinque ad margines vestita sunt pilis minutis albicantibus, præsertim ad latera.

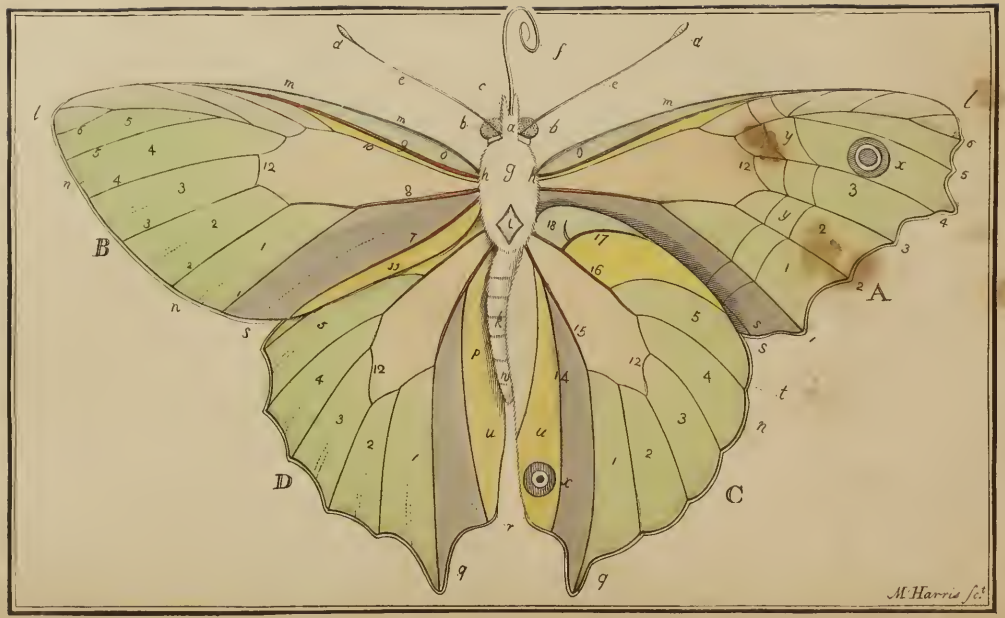
PEDES ferrugineo fusci.

TARSI fusci, absque spinis in secundo pare pedum (quarum mentionem facit *Drury*.)

ALÆ hyalinæ fuscæ, costa ferruginea.

(N. B. Figura 3. apud Drury b. c. mihi videtur esse varietas hujus Tabani).

FINIS.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THE ENGLISH LEPIDOPTERA:

OR, THE

AURELIAN'S POCKET COMPANION:

CONTAINING

A CATALOGUE OF UPWARD OF FOUR HUNDRED

MOTHS AND *BUTTERFLIES*,

THE FOOD OF THEIR RESPECTIVE CATERPILLARS,
THE TIME OF CHANGING INTO CHRYSALIS,
AND APPEARANCE IN THE WINGED STATE:

ALSO,

THE PLACES WHERE THEY FREQUENT AND
ARE USUALLY FOUND;

WITH A CONCISE DESCRIPTION OF EACH, AND
THEIR DIMENSIONS.

BY MOSES HARRIS.

AUTHOR OF THE AURELIAN, OR HISTORY OF ENGLISH INSECTS.

LONDON:

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TABLE

OF

TERMS used in the DESCRIPTION *of the various Parts of the BUTTERFLY, refering to the Plate, wherein they are accurately delineated.*

a HEAD.
b Eyes.
c Palpi.
d Knobs of the Antennae.
e Threads of the Antennae.
f Tongue.
g Thorax.
h Shoulders.
i Scutulum or Escutcheon.
k Abdomen with its Anuli.
l Tips or Apices.
m Sector Edge.
n Fringes.
o Sector.
p Abdominal Groove.
q Tails.
r Abdominal Corners.
s Lower Corners of the superior Wings.
t Outer Corners of the inferior ditto.
u Abdominal Edges.
w Anus.
x Ocelli.
y Bar, Band or Garter.

A Superior Wing angulated.
B Superior Wing, smooth or even edged.
C Inferior Wing scalloped.
D Inferior Wing indenticulated.

The

The Interior Parts of the Superior Wing described.

The Parts coloured *Green*, are the FAN-TENDONS and MEMBRANES, marked in Numerical Order; viz. 1ſt, 2d, 3d, &c.

PAPILIONES have only five of theſe MEMBRANES, and ſix TENDONS.

The Parts coloured with *Pale Crimſon*, are the TABLES.

The *Pale Blue*, ſhews the SECTORS.

Shoulder MEMBRANE—*Yellow*.

Slip MEMBRANE—Pale Orange.

Long MEMBRANE—Pale Indian Ink.

The Parts coloured Purple, are the SECTOR TENDONS and MEMBRANES, and it is in this Part of the Wing only, wherein one GENUS differs from another.

The Grand Tendons are coloured deep Red, and are three in Number; viz.

7 Long Tendon,
8 Principal Tendon, } Grand Tendons.
9 Shoulder Tendon,
10 Table Tendon.
11 Slip Edge.
12 Bar Tendon.

Interior Parts of the Inferior Wing described.

Green, ſhews the FAN-TENDONS and MEMBRANES, which are the ſame in Number as in the Superior Wings.

Pale Crimſon, ſhews the TABLE MEMBRANE.

Blue. The SECTOR.

Yellow.

Yellow. TABLE MEMBRANE, or BENT ditto.
Pale Indian Ink. LONG MEMBRANE.
Pale Orange. ACCUTE MEMBRANE.
Deep Red. GRAND TENDONS, three in Number; viz.

15 POSTERIOR TENDON,
16 TABLE TENDON,
17 BENT or FEMORAL TENDON,
} Grand Tendons.

18 Spur; this Part anſwers to that little inſtrument in the Phalæna, called Spring.
13 Abdominal Tendon.
14 Long Tendon.

It is worthy to be remarked, that although the ſeveral Parts of the Inferior Wings greatly correſpond with the reſpective Parts of the Superior, yet here are no Parts anſwerable to the Sector Tendons and Membranes, and which are diſtinguiſhed with Purple in the Superior; but Providence ſeems to have ſupplied that Deficiency, if I may call it one, by adding another on the oppoſite Edge of the Wing, called THE ABDOMINAL MEMBRANE, and is coloured Purple.

PREFACE.

THE uſefulneſs of the following little work will be obvious at firſt view, to any one who has the ſlighteſt acquaintance with this part of Natural Hiſtory: The author found it ſo neceſſary, that he always carried a copy of it in his pocket ever ſince he began to collect the different ſpecies of the LEPIDOPTERA.

What is now offered to the Publick has been reviſed and properly arranged, ſo that it is truly a compendium and repoſitory of every new diſcovery of the author's reſearches for almoſt theſe thirty years diligent application.

It is divided into eight columns:

The *Firſt* contains a Catalogue of the Engliſh Names of MOTHS and BUTTERFLIES, which are ranged in alphabetical order for the more eaſy finding any ſubject enquired for.

The *Second* ſhews what the Inſects feed upon in the Caterpillar ſtate.

The

The *Third*, the times of the transformation into the Chryſalis.

The *Fourth*, the times when it appears in the winged ſtate, and the length of time it has lain in Chryſalis.

In the *Fifth* is preciſely ſet down how much the Fly meaſures, or expands, from the tip of one wing to the tip of the other, in inches and parts of an inch.

The *Sixth* points out the places where the inſects frequent, or are commonly found, in the winged ſtate.

The *ſeventh* is a ſhort deſcription of the upper ſide of the wings, intended to aſſiſt the memory of the reader, and that he may the better diſtinguiſh one from another: It is therefore hoped, the brevity of the deſcriptions will be excuſed, as the nature of this work could not admit of deſcriptions more particular and full, as it is only meant to give an idea of each, and in what they differ from one another.

In the *Eighth* column are the *Linnean* Names, with

with the number annexed to each inſect as it is numerically placed in that author, in his twelfth edition.

It is neceſſary to acquaint the reader, that where the particular day of the month is ſet down in the third and fourth columns, it is not there meant that the inſect is exact to that particular day as to its transformation, or appearance in the winged ſtate, but muſt be underſtood to be as near as poſſible about the time; and that the inſect remains as long in the Chryſalis ſtate as the difference between the days of the month ſet down in each column.——As for example: The *Admirable*, the ſecond inſect in the Catalogue, is mentioned as changing into Chryſalis the 10th of July, and coming forth in the flying ſtate the 1ſt of Auguſt; this is to ſignify, that the beginning, or firſt part of July is about the time for the generality of that ſpecies to change into Chryſalis; and the Caterpillar, which happens to change on the 10th of July, will come forth in the winged ſtate on the firſt of Auguſt, as they always remain three weeks in the Chryſalis ſtate.

It muſt alſo be obſerved, that of ſome of the

Lepidoptera there are two or three broods in a Summer, conſequently the ſeparate times of the ſeveral broods muſt be noted, as well of their transformation into the Chryſalis, as their appearance in the winged ſtate. Here I was under the neceſſity of ſetting down two or three different months in one column. For the better underſtanding of which, we will give the *Speckled wood*, 49, as an example: In the third column is placed *Mar. May, July,* and in the fourth *April, June, Aug.* here is meant, that the Caterpillars which change into Chryſalis in March appear in the fly in April; the Caterpillars from this brood change in May and appear in June; and again the Caterpillars proceeding from ſecond brood, change into Chryſalis in July, and come forth in the flying ſtate in Auguſt.

I have alſo given an alphabetical Liſt of *Linnean* Names to as many of the Engliſh ſpecies as I could find in that author; or as many as I was certain agreed with thoſe of the Engliſh inſects, for there are a great number of which I was doubtful, and choſe not to admit them for fear of making miſtakes. This Liſt refers to the Engliſh one, where the hiſtory of the inſect inquired after may be found.

I had

I had once determined to give neceſſary and full directions to the young beginner relative to the collecting, breeding, and managing the various ſpecies, in their ſeveral ſtates; but as that has been induſtriouſly treated on by others, I ſhall content myſelf with ſetting down ſome rules and remarks founded on my own experience, and which are very neceſſary to be known, as they will prevent accidents, and ſuch as the collector would not perhaps know how to account for.

And *firſt*, Let not the boxes which are taken in the pocket for Caterpillars, nor the cages made for breeding inſects be made of deal or fir, except they be well lined with paper; for the effluvia of the turpentine, raiſed by the heat of the pocket, or that of the ſun, is extremely prejudicial to them, and ſeldom fails to deſtroy the greateſt part of the Caterpillars contained therein for any length of time. The cauſe of the deaths of the Caterpillars, found at the bottoms of cages, or pocket boxes, is generally attributed to bruiſes got in beating the trees for them at the time of collecting them, which is a great miſtake, as thoſe which happen to be injured in beating, ſeldom die till the time of changing their

their ſkin, or of their transformation, and will nevertheleſs eat heartily till either of theſe times approach. If the inſide of the cages or boxes be well lined with paper, as aforeſaid, and air holes made in the ſides and tops, covered with crape, or canvaſs, &c. to admit the air, it will in a very great meaſure prevent the above ill effects.

2*dly*, It is needleſs to go out to collect inſects if the weather is cool, or much wind ſtiring, as at ſuch times almoſt all kinds of inſects conceal themſelves, dreading the wind as much as they diſlike the cold. Many fruitleſs journies have been made even in the midſt of ſummer on this account. A warm and damp air, ſuch as generally comes after rain, is what almoſt all ſorts of Inſects are fond of, in every ſtate; and it is moſtly for this reaſon they fly ſo near the earth at ſuch times, that they may enjoy the humidity which ariſe in ſteams from the ground. In hot and dry days it is common to obſerve the Butterflies ſettle in numbers on the mud in ditches; and I have often ſeen above twenty ſo cloſe together as to be contained within the circumference of a ſmall hoop; by which it is found that heat with moiſture beſt agrees with their nature.

But

But the *Garden White* is as good a token for fine weather as may be; when theſe flies are out in a morning, it ſeldom or ever happens but a fine day enſues. This fly is alſo called the *Tally* for the *Swallowtail*, which appears from the Chryſalis at the ſame times of the year, as may be ſeen by the Catalogue.

3*dly*, In the preſervation of the Chryſalides during the winter, be ſure to keep them in cold and moiſt places, as in a cellar or out houſe, otherwiſe the greateſt part of them will be killed, eſpecially thoſe whoſe nature it is to change in the earth, as they cannot bear to be kept warm and dry, which is apt to exhale the nutritive moiſture from them, hardens their ſhell, and weakens the inſects ſo much, that at the time when they ſhould appear in their flying ſtate, they have not ſtrength left ſufficient to burſt open the Chryſalis and come forth of their confinement; in this caſe the miſerable animal muſt die, as many have done, occaſioned intirely by this miſmanagement of them.

4*thly*, When any of the *Lepidoptera* are extended on the ſetting board beneath the card braces,

braces, let them remain in that ſituation, till not only the aqueous moiſture be evaporated, but the oily and ſaline particles, which will in a great meaſure fly off alſo, otherways the conſequence will be bad: viz. the wings will not only ſtart from their natural poſition, but the bodies with the *antenna* will grow mouldy when in the cabinet, or repoſitory; and what is of worſe conſequence, they will breed millions of *Animalcule* which will infallibly deſtroy them, except ſome remedy is applied. I would therefore adviſe they may be kept in ſome dry place open to the air, and where they may be free from duſt for a conſiderable length of time before they are placed in the cabinet.

5thly, If at any time the inſects, in a cabinet or box where they are placed for preſervation, ſhould appear as if growing mouldy, or be infeſted with ſmall *Animalcule*, which is known by a kind of duſt ſeen beneath the abdomen; in this caſe the ſmoke of tobacco is the only effectual remedy, which muſt be blown through the ſmall end of a pipe admitted through a hole made for that purpoſe at the back part of the drawer or box, this not only corrects the putrid

and

and ſtagnant air, but deſtroys thoſe formidable enemies which often deſtroy whole cabinets of Inſects: this will preſerve them for twelve-months, when it will be neceſſary to act the ſame part over again. It may be feared and objected that the ſmoke may in ſome meaſure damage the inſects, but a little experience will plainly evince the contrary.

A TABLE

PAPILIO. ENGLISH Names.	Food of the caterpillar	Change into the chryſalis	Appears in the winged ſtate.	Expands Inches
1 ADmirable, white	-	-	June 20	2 3/4
2 Admirable	nettles	July 10	Aug. 1.	2 1/2
3 Blue, azure	graſs	-	May 10	1 1/4
4 Blue, common	graſs	May	June 1	1
5 Blue, argus	graſs	June	July 9	1 1/2
6 Blue, clifden	-	June 1	June 20	1 1/4
7 Blue, chalkhill	-	June 1	July 13	1 1/4
8 Blue, ſilverſtuded	graſs	May	June 20	1
9 Brimſtone	buckthorn	May	June 22	2 3/4
10 Brown, meadow	graſs	May 12	June 4	2 1/4
11 Bramble or green fly	bramble	July	May 1	1 1/4
12 Comma	hops, nettles	Jan. 18, Aug	June 30 Sept	2 1/4
13 Copper	graſs	-	June Aug	1
14 Emperor, purple	ſallow	May 25	June 29	3

Uſual haunts in the winged ſtate	Upper ſide deſcribed	LINNEAN Names.
1 Woods -	Black, with white bars	Camilla 187
2 Lanes -	Black, with red bars	Attalanta 175
3 Woods -	Blue, tips black	Argiolus 234
4 Long graſs -	Blue, fringes white	
5 Long graſs -	Blue, mixt brown	
6 Commons near Clifden	Pale blue	
7 Commons near woods	Pale blue	
8 Commons -	Blue, fringes white	
9 Meadows -	Yellow, red ſpot in the middle	Rhamni 106
10 Meadows -	Brown, ſmall ring near the tip	Jurtina 155
11 Woods -	Brown, green on the under ſide	Rubi 237
12 Meadows -	Orange, with black ſpots	C. album 168
13 Meadows -	Shining copper ſpotted with black	Virgaurea 253
14 Woods -	Purple with white bars	Iris 161

ENGLISH Names.	Food of the caterpillar	Change into chryſalis	Appears in the winged ſtate.	Expands Inches
15 Fritillaria, ſilver waſh	-	May 31	June 20	3
16 Fritillaria, high brown	violets	May 20	June 12	2 3/4
17 Fritillaria, dark green	-	May 20	June 10	2 3/4
18 Fritillaria, pearl border	-	April 30	May 11	2 1/4
19 Fritillaria, pearl border likneſs	-	June 4	June 18	2 1/4
20 Fritillaria, greaſey	devils bitt	April 17	May 1	2 1/4
21 Fritillaria, Queen of Spain	-	April	May 10	2 1/2
22 Fritillaria, Glanville	long plantain	April 15	May 15	2 1/4
23 Fritillaria, duke of Burgundy	-	May 12	May 28	1
24 Fritillaria, ſmall pearl border	heath	May 12	May 28	2
25 Grayline -	graſs	June 30	July 20	2 1/2
26 Griſtle -	-	April	May 11	1
27 Keeper, large gate	graſs	June	July 12	2
28 Keeper, ſmall gate	graſs	April 5	April 29	1

Haunts in the winged ſtate	Upper ſide deſcribed	LINNEAN Names.
15 Woods -	Yellow brown ſtreaked and ſpotted with black	Paphia 209
16 Woods -	Orange brown, with black ſpots	Adippe 212
17 Woods -	Orange brown ſpotted with black	Aglaza 211
18 Woods -	Orange ſpotted with black	Euphroſyne 241
19 Heaths near woods	Checker'd black and orange	Maturna 204
20 Woods and meadows	Orange and yellow checker'd with black	
21 Gamling Gay wood near Cambridge	Orange brown ſpotted with black	Lathonia 213
22 Meadows -	Orange brown ſpotted with black	Cinxia 205
23 Woods -	Brown ſpotted with black	Lucina 203
24 Woods -	Orange brown ſpotted with black	
25 Meadows and woods	Dark brown with ſmall circle at tips	Semele 148
26 Woods -	Dark brown with ſpots of white	
27 Hedges -	Orange brown ſmall ring on the tips	Megera 142
28 Meadows -	Yellow with ring on each tip	Pamphilus 239

ENGLISH Names.	Food of the caterpillar	Change into chryſalis	Appears in the winged ſtate.	Expands Inches
29 Lady, painted	nettles, thiſtles & docks	July 20	Aug. 1.	2 3/4
30 Lady of the woods	wild cole	July 25	May 6	1 1/4
31 Peacock -	nettles	July 7	July 28	3
32 Ringlett -	graſs	June 1	June 20	2
33 Tortoiceſhell, large	elm tree	June 21	July 12	3
34 Tortoiceſhell, ſmall	nettles	Aug. 16 June 3	Aug. 30 June 17	2
35 Skipper, large	-	May 5 June 5	May 25 July 25	1 1/2
36 Skipper, ſmall	-	June 25	July 17	1
37 Skipper, dingey	-	April	May 6	1 1/4
38 Skipper, pearl	-	-	Aug. 25	1 1/2
39 Streak, brown hair	buckthorn	July 1	Aug. 1	1 1/2
40 Streak, purple hair	oak	June 6	July 17	1 1/4
41 Surpriſe, grand	willow	July 8	July 28	3 1/4
42 Streak, hair dark	-	-	Aug. 1	1 1/4

Haunts in the winged ſtate.	Upper ſide deſcribed	LINNEAN Names.
29 Furzes and teazles	Orange and carnation clouded with black, 5 white ſpots at each tip	Cardui 157
30 Hedge ſides -	White, ſuperior wings tip'd with orange	Cardamines 85
31 Lanes and hedge ſides	Dark red brown, large eye like ſpot on each wing	Io 131
32 Woods and hedge ſides	Brown ſmall rings on each wing	Hyperantus 127
33 Lanes -	Orange brown, 3 large black ſpots on the ſector edge	Polychloros 166
34 Banks -	Red orange, 3 black ſpots on ſector edge of each wing	Urticæ 167
35 Woods -	Yellow orange ſpotted with brown	Comma 256
36 Woods -	Yellow orange with a ſtreak of black in the middle	
37 Woods, heaths, and Meadows	Dark brown having a lightiſh bar croſs the ſuperior wings	Tages 268
38 Swampy ground on briars, Hanwell heath near Ealing		
39 Hedges	Brown with an orange ſpot on each ſuperior wing	Betulæ 220
40 Buſhes	Black with blue ſpot near the body	Quercus 222
41 Willows	Dark brown with a broad yellow border	Antiopa 165
42 Hedges		

ENGLISH Names.	Food of the caterpillar	Change into chryſalis	Appears in the winged ſtate	Expands Inches
43 Tail, ſwallow	wild fennel and carrots	Sep. 23 July 15	May 15 Aug. 10	3¼
44 White, large garden	cabbage	Sep. 23 July 15	May 15 Aug. 10	2¾
45 White, ſmall garden	cabbage	Sep. 23 July 15	May 15 Aug. 10	1¾
46 White, black veined	white thorn	May 16	June 6	2½
47 White, green veined	cabbage	Sep.	May 11	1¾
48 White, wood	-	Octob. July	May 6 Aug. 6	1½
49 Wood, ſpecled	graſs	Mar. May July	April June Aug.	2
50 White, marbled	graſs	May	June 6	2
51 Wall -	graſs	May 2 July 2	June 2 Aug. 2	2¼
52 Yellow, clouded	-	July	Aug. 7	2¼
53 Yellow, pale clouded	-	July	Aug. 9	2¼

Haunts in the winged ſtate.	Upper ſide deſcribed	LINNEAN Names
43 Meadows, Briſtol and Weſtram	Yellow ſpotted with black. Two tails.	Machaon 33
44 Gardens -	White, two black ſpots and black tips.	Braſſicæ 75
45 Gardens -	White, with two round black ſpots on ſuperior wing with black tips.	Rapæ, 76
46 Cornfields -	White, tendons black.	Crategi, 72
47 Gardens -	White, with two black ſpots and black tips.	Napi, 77
48 Woods -	White, grey tips.	
49 Woods in lanes	Brown, ſpoted with cream colour.	Ægeria, 143
50 Meadows -	White, checker'd with black	Galathea, 147
51 Walls and banks	Clay colour, clouded with brown, a ring at the tip.	Mæra, 141
52 Meadows -	Yellow orange, bordered with black clouds.	Hyale. 100
53 Meadows -	Pale yellow, bordered with black clouds.	

PHALÆNA. ENGLISH Names.	Food of the caterpillar	Change into chryſalis	Appears in the winged ſtate.	Expands Inches
54 ARches, buff	oak & white thorn	June 29	July 29	1 3/4
55 Arches black	oak	June 9.	July 9	3
56 Arches dark	cabbage	May	July	2
57 Arches red	oak	June 1.	July 1	1 1/4
58 Antler -	-	-	-	
59 Arches grey	-	May 15	June 15	1
60 Arrach wild	arrach	Aug. 28	Sep.	1 1/4
61 Argus buff	white thorn	April	May	1
62 Apple-tree moth	apples	Sep.	May	5/8
63 Arratch, July	arrach	Sep. 12	July	1 1/2
64 Argent and ſable	white thorn	May 6	June 6	1 1/2
65 Broad bar, ſhaded	heath	-	May	1 1/8
66 Brown, light work	heath	-	July	1
67 Beauty, minor	fruit trees	June	July	1

Haunts in the winged ſtate	Upper ſide deſcribed	LINNEAN Names.
54 Woods	Dark buff, with ſmall arched markings.	
55 Woods	White, with ſtrong black arch like markings, tail red.	Monicha 43
56 Gardens	Dark brown, with black arched markings.	
57 Woods	Orange red, with black arched lines.	
58		
59 Woods		
60 Fields	Buff colour waved with undulated bars	Antriplicis 173
61 Lanes	Buff colour, ſpeckled with brown ſpecks	Amataria 201
62 Orchards	Brown, marbled with black	Pomonilla 401
63 Fields	Pale orange, with undulated black and brown bars.	
64 Lanes	White, beautifully checker'd and ſpotted with black.	
65 Heaths	Grey, having a broad dark bar.	
66 Heaths	Brown, prettily marbled with white.	
67 Orchards	Light brown, mottled with dark brown.	

ENGLISH Names.	Food of the caterpillar	Change into the chryſalis	Appears in the winged ſtate.	Expands Inches
68 Back, large diamond	-	April	May 18	¾
69 Back, ſmall diamond	-	April	May 18	½
70 Back diamond likeneſs	-	April	May	⅜
71 Barr, broad	oak	-	June	¼
72 Barr, Oak	oak	May	June	1
73 Bar, ſcallap wing broad	oaks	-	Aug. 10	1¼
74 Bar, tripple	oak	-	May 26	1½
75 Bar, purple	-	-	June 5	
76 Bar, dun	oak	May 27	Aug. 10	1¼
77 Beauty, brindled	lime, and lalach	June 30	April 7	2
78 Beauty, oak	lime, oak, elm	May 26	Mar. 5	2½
79 Beauty, pale oak	oak	Octob.	May 7	2
80 Beauty, hornſey	black thorn	-	Aug. 20 June 2	1½
81 Beauty, mottled	black thorn	May 10	June 12	

Haunts in the winged ſtate.	Upper ſide deſcribed	LINNEAN Names.
68 Gardens -	Dark brown, having two yellow ſpots and two bright ſilvery lines	
69 Gardens -	Black, with three yellow ſpots on each ſuperior wing.	
70 Gardens -	Black, with one yellow ſpot, under wings yellow.	
71 Woods -	Brown, having a broad dark bar.	
72 Woods -	Brown, having three dark bars.	
73 Woods -	Wings much indented, and of a light brown, having a broad dark bar, with a round ſmall ring in the centre of the wing.	
74 Woods -	Grey, having three double bars croſs the wing	
75 -	-	
76 Woods -	Light brown, broad bar croſs the middle, under-wings black.	
77 Gardens againſt pales	Yellow brown, and brindled having bars croſſing the wings.	
78 Woods -	White freckled with black, having two brown bars croſſing each wing.	
79 Woods -	Pale brown, handſomely vein'd with dark brown.	
80 Lanes -	Wings, having a ſucceſſion of bars of grey, brown and orange.	
81 Lanes -	Light brown, beautifully mottled with dark brown.	

ENGLISH Names.	Food of the caterpillar	Change into chryſalis	Appears in the winged ſtate.	Expands Inches
82 Beauty, Clifden	white thorn	June	July	1 1/2
83 Beauty, willow	willow	June 10	Aug. 10	2
84 Beauty, Richmond	black and white thorn,	May 5	June 5	1 1/2
85 Bell,	elm	-	May 28	1
86 Bird, humming	ladies bed-ſtraw	Aug.	April May	2 1/4
87 Bird, clear winged humming ſphinx	willowwood	-	May 1	2
88 Bird, ſmall clear winged humming ſphinx	-	-	Aug. 22	1 1/2
89 Bird, leaſt clear winged humming ſphinx	currantbuſh ſtalks	-	May 29	1
90 Biſhop	lime moſs	-	-	1
91 Bloſſom, peach	raſpberry leaves	June	July 16	1 1/2
92 Bloſſom, peaſe	-	June	July	1
93 Beauty, pale ſpotted	-	-	June	3/4
94 Bluſh, maiden	oak	-	May	1
95 Border, blue	white thorn	-	May	1 1/8

Uſual haunts in the winged ſtate	Upper ſide deſcribed	LINNEAN Names.
82 Lanes -	Silver white, a large brown cloud on the ſector edge, the ſame edge hath a broad border of brown, with a white ſquare ſpot in middle.	
83 On the barks of willows	Of a pale greeniſh brown, beautifully tabied with undulating bars.	
84 Hedges -	Wings angulated, of a pale yellow orange, and hath broad brown bars.	Syringaria 206
85 Barks of elms	Greyiſh brown, near the tips is tinged with red brown.	
86 Gardens on flowers	Wings ſuperior brown, the inferior orange, the anus tufted.	Stellatarum Sphinx 27
87 Gardens on flowers	Wings tranſparent, with a broad brown border, and broad yellow ring round the abdomen.	Fuciformis Sphinx 28
88 Seen on a flower in Norwood	Wings tranſparent, anus tufted.	
89 On the leaves of the currant	Wings tranſparent, anus tufted.	Culiciformis 30
90 Againſt walls or ſometimes trees	Lightiſh grey marbled with black.	
91 -	Dark brown, having five large roſe colour'd ſpots.	
92 -	-	Delphinii 188
93 Woods -	Pale white, with pale clouds.	
94 Woods -	Buff, with a bluſh of pink in the middle of the wing.	
95 Lanes -	White, triangular ſpot in the middle, and a border of blue grey.	

ENGLISH Names.	Food of the caterpillar	Change into chryſalis	Appears in the winged ſtate	Expands Inches
96 Border, clouded	oak	May 26	June 26	1 1/4
97 Border, laced	oak	-	May 12 July 6	1 1/4
98 Braſs, burniſhed	archangel	July 20 May 5	Aug. 1 June 6	1 1/2
99 Braſs burniſhed likeneſs	-	-	June	2
100 Beauty, ſmall brindled	oak	Aug.	April	1
101 Beauty, pale brindled	lime, elm	-	Feb. 21	
102 Bar, grey ſcallaped	heaths	-	May	1 1/4
103 Brindled	haſle, oak	June 14	April	1
104 Border, Eſſex broad	-	-	-	
105 Buff, clouded	graſs	-	June 5	2
106 Buff, waved	-	April	May	
107 Buff waved likeneſs	-	-	-	
108 Burnet, ſphinx	hay, graſs	May 11	June 2	1 1/2
109 Burnet, companion	graſs	April	May 20	1 1/4

Haunts in the winged state.	Upper side described	LINNEAN Names.
96 Woods	White, bordered with large black clouds.	
97 Woods	White, having a broad bar down the middle, border like lace.	
98 Meadows	Wings partly brown shining like polish'd brass.	Chrysitis 126
99 Meadows	Brown having a large square spot shining like brass	
100 Woods	Brown prettily brindled.	
101		
102 Heaths	Grey, with two occult bars or broken lines which cross them.	
103 Woods	Dirty buff freckled with brown.	
104		
105 Southgate warren	Golden yellow, red fringe and two large spots on wings.	Quadra 114
106 Hedges		
107 Lanes		
108 Meadows	Shining green, six spots of scarlet, inferiors scarlet.	Filipendlæ 34
109 Fields	Brown clouded, inferior yellow vein'd with brown.	

ENGLISH Names.	Food of the caterpillar	Change into chryſalis	Appears in the winged ſtate.	Expands Inches
110 Bar, gray broad -	-	-	May	1½
111 Brindled, pale -	-	-	Mar. 5	1¾
112 Betony, water -	water betony	July	April 20	1¾
113 Betony, water likneſs	cabbage	July	Aug	1¼
114 Beauty, boltons -	-	May	June	1½
115 Bluſh, double bar'd	-	-	May	1¼
116 Buff-lined, beautiful	heath	-	May	1
117 Codling -	codling	July	June	¾
118 Chivern'd, broad -	-	May	June	1½
119 Carpet -	-	-	July 17	1½
120 Carpet, Clifden -	-	-	July	1¼
121 Carpet, clouded -	white thorn	-	May	1¼
122 Carpet, cloaked -	black thorn	-	May	1¼
123 Carpet, green -	white thorn	-	May	

Haunts in the winged ſtate.	Upper ſide deſcribed	LINNEAN Names
110 Heaths -	Grey, with a broad brownish bar; inferior pale.	
111 Woods -		
112 Bank ſides -	Brown, with a dark ſtreak of brown on ſlip edge.	Verbaſci 152
113 Gardens -	Dark buff colour ſtreaked with deep brown.	
114 Hedges -	Grey, full of neat undulated bars; one in middle broad.	
115 Hedges -		
116 Heaths in Yorkſhire	Buff colour veined with neat bars of brown.	
117 Orchards -	Fine brown marbled with a darker colour.	
118 Lanes -	Pale brown, with broad chivern like bars of dark brown.	
119 Woods -	White, with broad bars of dark brown.	
120 Lanes -		
121 Lanes -	White, with clouded bars of brown.	
122 Lanes -	White, half the wing toward the thorax dark brown.	
123 -	Dark green bared with brown.	

ENGLISH Names.	Food of the caterpillar	Change into the chryſalis	Appears in the winged ſtate.	Expands Inches
124 Carpet, Hornſey -	oak	-	Aug.	1 1/4
125 Character, Hebrew	elm	Sep. 20	Mar. 13	1 1/2
126 Crimſon and gold	nettles	-	May 12	3/4
127 Crown -	-	-	-	
128 Cyper -	-	-	Feb. 18	1 1/4
129 Carpet, bar'd -	-	-	-	1 1/2
130 Dagger, dark -	willow	-	Aug.	1 1/2
131 Dagger, March -	oak	Sept	Mar. 10	1 1/4
132 Dagger, gray -	willow, and fruit trees	Sep.	May 27	1 1/4
133 Dagger, gray likneſs	oak	May 26	June 26	1 1/2
134 Da jour, marvel -	oak	May 26	July	1 3/4
135 Da jour, marvel likneſs -	oak	-	-	1
136 Da jour, mavel companion -	oak	-	-	1 1/4
137 Da jour, ſcarce marvel	birch	-	May	1 1/2

Haunts in the winged ſtate	Upper ſide deſcribed	LINNEAN Names.
124 Lanes near Hornſey	Bar'd with brown, between is orange colour.	
125 Near elms -	Dark brown, with a ſtrong black mark in the middle of the wing, or crooked ſpot.	
126 About nettles	Crimſon ſpotted with gold colour; inferior black with yellow bar.	
127 Lanes -		
128 Banks -		
129 Lanes -	White, having three broad bars of brown.	
130 Willow bark	Dark gray, with ſome marks in the wing like daggers.	
131 Bark of trees in woods	Light brown, full of ſhort lines, which are all parallel with the front or ſector edge.	
132 Bark of willows	Light gray, with ſtrong marks on the wing reſembling daggers.	Pſi 135
133 Woods -	This moth has a faint appearance of the above markings.	
134 Woods -	Of a light blue green, with marks of white, all over marked with crooked black marks.	
135 Woods -	This appears a little like the above.	
136 Woods -	Of an olive green, brindled with dark browns.	
137 Woods -	This is rather leſs than the Marvel da jour, but much ſtronger in the markings.	

ENGLISH Names.	Food of the caterpillar	Change into chryſalis	Appears in the winged ſtate.	Expands Inches
138 Da jour, ſcarce mavel	white thorn	-	May 20	1 1/8
139 Ditto, dark -	elm	-	Ap. 15	1
140 Ditto, pale -	white thorn	April	May	1
141 Dock -	dock	-	-	1 1/2
142 Dot -	nettles	Sep. 4	May 30	1 3/4
143 December -	white thorn	Nov.	Dec.	1 1/8
144 Drinker -	graſs under hedges	May 27	June 27	3
145 Diſmal -	willow bark	-	June	1 1/2
146 Dingy dot -	-	-	-	1
147 Eye, white line brown	marigolds	Aug. 14	May 20	1 1/4
148 Ear -	-	-	-	1 1/4
149 Egg, gooſe -	white thorn	April	May	1
150 Egger, large -	white thorn	June 21	July 18	3
151 Egger, ſmall -	black thorn	June 16	Mar. 23	1 1/2

Uſual haunts in the winged ſtate	Upper ſide deſcribed	LINNEAN Names.
138 Hedges in lanes	White, broad dark bar croſs the wing, a border of the ſame, and ſhoulder covered with brown.	
139 Gardens -	Like the above in its markings, but is leſs, and almoſt black.	
140 Graſs in meadows	Marked as the above, but the bars are of a pale brown.	
141 Near rubbiſh mounts		
142 Bank ſides -	Almoſt black, having a white dot in the middle of the wing.	
143 Hedge in lanes -	Dark brown, with very faint markings.	Populi 34
144 Lanes -	Female, of ſtrong buff colour, with a white ſpot in the middle of the wing. Male almoſt red.	Potatoria 23
145 Willow bark -	Of a plain ſhining dark brown, inferior wings light.	
146 -	Of a dingy brown, having a black ſpot in middle of the ſuperior wing.	
147 Gardens -	Brown, having an undulated white line near the fan edge.	Oleracea 171
148 Gardens -	Brown, having a ſtrong mark in the middle like the human ear.	
149 Woods -	White, having ſome clouds in the middle of the wing as if ſcorched.	
150 Lanes near woods	Yellow buff colour, with a white ſpot in the middle.	Quercus 25
151 Lanes -	Nearly black, having two light bars; anus tufted.	Laneſtris 28

ENGLISH Names,	Food of the caterpillar	Change into chryſalis	Appears in the winged ſtate	Expands Inches.
152 Egger, likneſs -	nettles	-	June	1 1/8
153 Egger, ſnout likneſs	nettles	May 9	June 3	1 1/4
154 Egger, oak -	oak	Octob.	May 15	1
155 Egger, graſs -	trefoil	May 12	Aug. 20	2 1/2
156 Eight, figure of -	crabtree	June	Aug. 9	1 1/4
157 Elephant, large, ſph.	ladies bed-ſtraw	Aug. 2.	May 23	2 1/2
158 Elephant, ſmall, ſph.	-	Aug.	May 27	1 1/2
159 Elephant, ſpotted, ſp.	meadows	Aug.	May 27	2 1/2
160 Ermine, large -	elder	Sept.	May 15	1 3/4
161 Emerald, large -	birch and broom	June 15	July 6	2 1/4
162 Emerald, ſmall -	white thorn	-	-	1 3/4
163 Emperor, -	black thorn, willow	July 8	Ap. 15	3 1/4
164 Ermine, ſmall -	white thorn	June 10	July 10	7/8
165 Ermine, cream -	elder	Aug. 18	May 15	1 3/4

Haunts in the winged ſtate.	Upper ſide deſcribed	LINNEAN Names.
152 Lanes -	Umber colour, having a broad brown bar croſſing the middle.	
153 Hedges -	Marked like the foregoing.	
154 Woods -	Brown, with two bars croſs the wing.	
155 Meadows -	Yellow brown, two light bars croſs the middle of the wing.	
156 Orchards -	Dark brown, with a mark like a double figure of eight in the middle.	Cæruleocephala 59
157 Rotherhith marſhes	Superior wings olive bordered with roſe colour: inferiors roſe colour.	Elpenor 17
158 Meadows——Oſterly wood near Brentford	This is marked like the above.	Porcellus 18
159 Meadows -	Superior wings of a roſe colour, with dark olive ſpots: the inferior are roſe colour.	Euphorbia 19
160 Pales in gardens	Wings narrow, and white, and are full of ſmall black ſpots.	
161 Woods -	Pea-green, having a white bar near the end of the wing.	Papilionaria 225
162 Hedges -	Pea green, with two bars croſs the wing.	
163 Oſier grounds -	Gray with red bars, having a large eye like ſpot in middle of each wing.	Pavonia 7
164 Whitethorn hedges	Gray, full of ſmall black ſpecks.	Padella 351
165 Garden pales -	Cream colour, full of black ſpecks.	

ENGLISH Names.	Food of the caterpillar	Change into chryſalis	Appears in the winged ſtate	Expands Inches
166 Ermine, thiſtle -	thiſtles	Aug.	May	1 1/4
167 Ermine, ſeven ſpot	-	-	-	1 3/4
168 Ermine, water -	ladies bed-ſtraw	Aug.	May	1 3/4
169 Ermine, diſtaff -	fruit trees	June 10	July 10	1
170 Eye, dark line brown	pot herbs	Aug.	May	1 1/2
171 Ear, ſhaded -	-	-	July	1 1/2
172 Fern -	fern	-	-	
173 Flyer, high -	ſallow	-	-	1 1/2
174 Flyer, July high	ſallow	June 4	July 4	1 3/4
175 Flyer, July high likneſs -	oak	Sept.	May	1 1/2
176 Footed, fan -	black thorn	-	-	1 1/4
177 Favourite, or broom moth -	chickweed	Sept.	May 28	1 1/2
178 Fox -	bramble	April	May	1 1/2
179 Fringe, dark -	-	-	June	1 1/4

Usual haunts in the winged state	Upper side described	LINNEAN Names.
166 Banks of thistles -	White, full of black specks	
167 Yorkshire -	White, having seven black specks on each superior wing.	
168 Rotherhith or marshes	White, having two black specks.	
169 Orchards -	White, full of black specks	Evonymella 359
170 Gardens -	Brown, light brown spot in middle of wing, and a black line or bar near the outer edge.	
171 Gardens -	Brown, having a dark spot in the middle like a human ear.	
172 Heaths -		
173 Near woods -	Olive green, having a number of interrupted crooked bars crossing them.	
174 Near woods -	Fine brown, full of undulated bars, both broad and narrow, of chocolate colour.	
175 Lanes -	See the description of the July high flyer.	
176 Lanes -	Pale umber, having three lines crossing the wing, and two long feathers protruding from the breast.	
177 Meadows -	Red brown, with broken bars of a cream colour, particularly one near the fan edge.	Pisi 172
178 Near woods -	Male red brown, white spot in middle, and a light bar near the fan edge.	Rubi 29
179 Lanes -	Narrow wings of dark lead colour; fringes broad.	

ENGLISH Names.	Food of the caterpillar	Change into chryſalis	Appears in the winged ſtate.	Expands Inches
180 Forreſter, ſphinx	ſorrel	May 3	May 27	1 1/4
181 Fringe, gold	oak	June 1	Aug.	1 3/4
182 Furbelow	gardens	-	Aug	1 1/4
183 Furbelow, pale	-	-	-	1 3/4
184 Footman	-	-	-	1 1/4
185 Freckled	pot herbs	Aug	Sep. 20	1 3/4
186 Gentlewoman, old	cabbage	July 8	June 13	1 1/2
187 Gentlewoman, ſmall old	herb mercury	June	Aug.	1 1/4
188 Grey, dappled	-	-	-	1 1/4
189 Green, pea	oak	May 29	June 20	3/4
190 Ghoſt	roots of burdock	May 5	June 5	2 1/2
191 Glory, Ealings	white thorn	May 23	Sep.	1 3/4
192 Glory, Kentiſh	-	-	April	2 1/2
193 Goat	willowwood	May 25	June 25	3 1/2

Haunts in the winged ſtate.	Upper ſide deſcribed	LINNEAN Names.
180 Meadows -	Intirely of green, ſhining like ſatin.	Statices 47
181 Meadows -	Crimſon, two gold ſpots on ſector edge; fringe gold colour.	
182 -	Pale brown, with daſhes of dark brown, all parallel to the ſector edge.	
183 -	Like the foregoing, but paler.	
184 Lanes -	Dark lead colour, bordered round with cream colour.	
185 Gardens -	Grey freckled with brown.	
186 Gardens -	Brown freckled with black, a white mark like an ear in middle of wing, and a broken bar near the edge.	Braſſicæ 163
187 Banks, ditches -	This is like the above, but leſs and paler.	
188 Gardens -	Gray dappled and freckled with brown, like the Freckled but much leſs.	
189 Oak trees -	Green; inferior light brown.	Viridana 286
190 Church yards -	Male like white ſattin: female golden yellow, with red marks and ſpots.	Humuli 84
191 Hedges at Ealing -	Brown, variegated with ſhades of green, with ſome marks like daggers.	Oxyacanthæ 165
192 Woods -	Light brown, with dark triangular ſpots.	Verſicolora 32
193 Willow bark -	Gray, full of ſmall black veins and ſtreaks, like net work or any thing full of cracks.	Coſſus 63

	ENGLISH Names.	Food of the caterpillar	Change into chryſalis	Appears in the winged ſtate.	Expands Inches
194	Graſs, ſword -	ſword graſs	Aug.	May	2 1/2
195	Gothic -	roots of nettles	May 5	June 5	1 1/2
196	Gothic, dark -	water betony	May 15	June 23	1 3/4
197	Graſs, knot -	knot graſs	Aug.	May	1 1/2
198	Green, cream border'd pea -	willow	May	June	1/4
199	Ground, ſilver -	white thorn	April	May 21	1 1/2
200	Gipſey -	fruit trees	July 11	July 31	2
201	Ground, beautiful cheſnut -	-	June	July	1 3/4
202	Hawk, eyed, ſphinx	willow and apple trees	July & Aug.	June 6	3 1/4
203	Hawk, privet, ſphinx	privet hedges	Aug.	June 7	4 1/2
204	Hawk, poplar, ſphinx	poplar and willow	Sep. 15	May 6	3 1/2
205	Hawk, unicorn, ſph.	bindweed	June	Sept.	4 3/4
206	Hawk, bee tyger	jeſſamine, potatoes, green elder	Sept.	July 22	5
207	Hawk, lime, ſphinx	lime tree	Sept.	May 24	3

Haunts in the winged ſtate	Upper ſide deſcribed	LINNEAN Names.
194 Marſhes -	Light brown, daſhed with dark brown ſhades parallel to the ſector edge, dark brown ſpots in middle.	Exſoleta 151
195 Banks -	Dark brown, with a number of light lines croſſing each other; ſome appear like arches.	
196 Banks -	This is ſimilar to the above but handſomer.	
197 Dunghills -	Gray brown, brindled and variegated with a variety of brown ſhades.	
198 Willows -	Green, bordered on the ſector edge with yellow.	
199 Whitethorn hedges	White, having an irregular brown bar croſs the middle, which is generally divided at bottom.	
200 -	Grayiſh brown, having arched black marks.	Diſpar 44
201 Yorkſhire -	Dark or chocolate colour towards the thorax; reſt a light brown; a yellow ſpot in the middle.	
202 Willows -	Between buff and pink colour, with ſhades of fine brown: inferior roſe colour, with ſpots like eyes.	Ocellata, ſph. 1
203 Privet hedges -	Superior brown, ſpot like a dagger in middle: inferior roſe colour, with two bars of black.	Liguſtri, ſph. 8
204 Bark of poplar and willows - -	Olive tendons, light brown inferior, red next the abdomen.	Populi, ſph. 2
205 Fields where bindweed grows -	Like the Privet, but the inferior wings gray, two bars of black.	Convolvuli, ſphinx, 6
206 Potatoe fields -	Superior brown; inferior yellow bared with black.	Atropos, ſph. 9
207 Lime tree bark -	Superior brown; two triangular ſpots of olive; tips white.	Tiliæ, ſph. 3

ENGLISH Names.	Food of the caterpillar	Change into the chryſalis	Appears in the winged ſtate.	Expands Inches
208 Heath, ſcarce -	heaths	May	June	1 1/4
209 Heart -	oak	Oct. 2	May	1 1/4
210 Heart and dart -	graſs	May	June	1 3/4
211 Heath, brown -	-	-	May	1 1/4
212 Heath, pale -	-	-	May 16	1 1/4
213 Herald -	willow, and ſallow	Sep. 4	Oct. 2	2 1/4
214 Half mourner -	oak	May 26	Aug. 20	2 1/4
215 Horn, Jappan long	oak	-	April	1/4
216 Horn, golden long	oak	-	May 11	1/4
217 Hornet -	poplar wood	May 20	July 12	2
218 Honor, maid of	oak	May	June 2	1 1/4
219 Houſewife, croſs bar'd	-	-	-	1 1/2
220 Houſewife, ſmall green	white thorn	May 26	June 26	3/4
221 Houſewife, large green	white thorn	May	June 26	1 1/4

Haunts in the winged ſtate.	Upper ſide deſcribed	LINNEAN Names.
208 Heaths -	Yellow, full of black lines, which divide the wing into ſquare white ſpots.	
209 Woods -	Pale buff, variegated with rediſh brown, having two round ſpots like rings in the middle.	Oo, ſphinx 81
210 Delight to be about pales -	Dark brown, with a ſpot in the middle like a heart, having a black ſtreak by it.	
211 Heaths -	Yellow, brindled all over with rediſh brown.	
212 Chalk pits by Charlton -	Like the former but paler.	
213 Dark parts of houſes	Rediſh brown, with a neat double white bar croſs the wing, and a white ſpeck in the middle.	Libatrix, ſph. 78
214 Woods -	Gray brown, having three double bars croſſing them.	
215 Woods -	Black, ſhining like gold; the horns three inches long and white.	
216 Woods -	Yellow intire.	
217 Againſt the bodies of poplar -	Wings tranſparent and yellow; brown ring round the abdomen, which is yellow.	Apiformis, ſphinx 29
218 Oak of honor by Peckham -	Green totally, with brown ſpots at the corners of the wings.	
219 Lanes -	Yellowiſh green.	
220 Lanes and hedges	Fine green, two white lines croſs the ſuperior wing.	Viridata 230
221 Hedges of whitethorn	This is like the above, but the fringes are ſpotted.	Vernaria 195

ENGLISH Names.	Food of the caterpillar	Change into chryſalis	Appears in the winged ſt e.	Expands Inches
222 Houſewife, ſmall pale	white thorn and oak	April	May	¾
223 Horn, green golden	oak	Sep.	Ap. 23	½
224 Inlaid -	-	-	May	1½
225 Jappan, large -	oak	-	May 12	¾
226 Jappan, ſmall -	oak	-	May 12	½
227 Ingrailed -	-	-	June	
228 Inſide, burniſhed -	-	-	June	
229 Knot, true lovers -	-	-	June	1¼
230 Lace, Bruſſels -	lime, moſs and oak	June 1	June 22	1½
231 Lady, Old -	-	July	Aug. 10	2¾
232 Lackey -	black thorn, brier	July 1	Aug.	1¼
233 Lackey, likeneſs -	-	-	-	1¼
234 Lappet -	white thorn, black thorn	May	July	3
235 Lappet, pine tree	pine tree	May	July	2¾

Haunts in the winged ſtate	Upper ſide deſcribed	LINNEAN Names.
222 Hedges in lanes -	Like the former, but ſmaller, and of a very pale green.	
223 Woods -	Of a greeniſh golden colour.	
224 Lanes near woods	Brown, edged round with yellow.	Complana 115
225 Woods -	Of a golden jappan colour; horns ſhort.	
226 Woods -	Golden jappan colour; antenna ſhort.	
227 Woods -		
228 Lanes -		
229 Gardens -	Brown, having a mark in the middle like what is termed a True Lover's Knot.	
230 Woods, on bark of trees -	Grayiſh, covered over with marks like lace work.	
231 Old houſes, or under bridges -	Dark ſooty brown, mark like a grave brocade, the tendons appear of a light brown.	Maura 124
232 Lanes near woods	Fox colour, two cream coloured bars on the ſuperior wing.	Neuſtria 35
233 -	Similar to the above, but more upon the olive.	
234 Lanes near woods	Dark red brown, wings broad and indented, having two indented bars like lines.	Quercifolia 18
235 -	Dark red brown, like the former, but leſs, and more upon the buff colour.	Pini 24

ENGLISH Names.	Food of the caterpillar	Change into the chryſalis	Appears in the winged ſtate.	Expands Inches
236 Likeneſs, ſmall ſword graſs -	-	-	-	1
237 L. Moth -	gooſberry buſh	May 21	June 9	1 1/4
238 Leopard wood -	within the bodies of aſh in nurſeries	May 28	June 28	2 3/4
239 Lines, ſilver -	-	-	-	1 1/4
240 Lines, triple -	oak	-	Aug	1 1/2
241 Lines, brown ſilver	white thorn	April 1	May 1	1 1/2
242 Lines, green ſilver	oak	Sep. 28	May 19	1 1/2
243 Lines, ſcarce ſilver	ſallow	June 6	June 26	2
244 Line, brown bright	-	-	-	1 3/4
245 Magpie, clouded	elms	April	May	2
246 Magpie, large -	currant buſh	June 19	July 25	2
247 Magpie, ſmall -	nettles	May 15	June 2	1 1/4
248 Magpie, ſmall likeneſs	nettles	June 26	July 10	1 3/4
249 Mark, China ruſh	ruſhes	-	-	1

Uſual haunts in the winged ſtate	Upper ſide deſcribed	LINNEAN Names.
236 Ditches near marſhes	Of a grayiſh brown, with mark on the ſector edge like the letter L.	
237 Gardens -	Of a grayiſh brown, having a mark on the middle of the wing like the letter L.	Wavaria 219
238 Woods -	White, full of round dark green ſpots like ſmall ſhot	Æſculi 83
239 Woods -		
240 Woods -	Brown olive, having three black lines croſſing the upper wing.	
241 Hedges -	Of a pale brown, having a whitiſh diagonal line on the ſuperior wing.	
242 Woods -	Of a fine green, with three diagonal ſilveriſh bars in the ſuperior wing.	Praſinana 285
243 Near woods -	Fine green, having two diagonal yellow lines on each ſuperior wing.	
244 -		
245 Rows of elms -	White, and marked like the large Magpie, but very faintly, with two brown ſpots on the ſuperior wing	
246 Gardens -	White, full of round black ſpots, which lay in double rows croſs the wing, yellow between.	Groſſulariata 242
247 Nettles -	Marked with rows of black ſpots, which join to each other, yellow between.	Urticata
248 Nettles -	Shining like pearl, of a yellowiſh colour, faintly marked like the former.	Virticalis
249 Near ponds -	White marked with buff, inferior white marked with black.	

ENGLISH Names.	Food of the caterpillar	Change into chryſalis	Appears in the winged ſtate	Expands Inches
250 Mark, brown China	elder	-	-	1 1/4
251 Mark, ſmall white China -	duckweed	April July	May 1 Aug. 1	3/4
252 Mark, ſmall golden China -	-	-	July	3/4
253 Mark, large golden China -	-	-	June	1
254 Mark likeneſs, dingy China -	nettles	-	June	1 1/4
255 Mottled croſs bar	-	-	-	
256 Magpie, dingy likeneſs -	-	-	-	1
257 Network, ſhaded	-	-	-	
258 Network, yellow	-	-	July	
259 November -	oak	Octob.	Nov.	2
260 November likeneſs	white thorn	Sept.	May	1 1/2
261 Nonpareil Clifden	-	-	July	3 1/2
262 Orange bar'd	oak	-	-	2
263 Orange -	oak	Sept.	May	2

Haunts in the winged ſtate.	Upper ſide deſcribed	LINNEAN Names.
250 Gardens -	Black, or dark brown, with round ſpots of white.	
251 Ponds and ditches	Male white, having a pretty ſpotted border to the inferior wings; female ruſty coloured.	Lemnata
252 Gardens -	Of a golden colour marbled with brown.	
253 Gardens -	Like the former, but larger and fainter marked.	
254 Pales -	White, faintly marked like the Brown China Mark.	
255 -		
256 -	Of a dark dingey colour, and very faintly marked like the Magpie Likeneſs.	
257 -		
258 -	Yellow marked with brown like network.	
259 Woods -	Buff colour, having two brown lines on each ſuperior wing.	
260 Lanes near woods	Marked like the November, but darker.	
261 Taken at Clifden, very ſcarce -	Superior wings gray marbled brown; inferior black having a blue broad band croſs the middle.	Fraxini 125
262 Woods -	Orange, having two lines croſs the wing.	
263 Woods -	Orange ſometimes clouded with brown.	

ENGLISH Names.	Food of the caterpillar	Change into chryſalis	Appears in the winged ſtate.	Expands Inches
264 Orange companion	oak	Sept.	May	1 1/2
265 O Moth	oak	-	May	1 3/4
266 Orange, mottled	burdock ſtalks	July 15	Aug. 30	1 1/2
267 Owl	oak	Sept.	Octob.	
268 October	oak	Sept	Octob.	1 3/4
269 Panther	oak	-	-	
270 Parſnip, cow	cow parſnip	-	-	1 1/4
271 Pebble	birch, willows, oſiers	July	Aug.	1 3/4
272 Pepper'd	elm, lime	Sep. 10	May 12	2 1/4
273 Phœnix	-	-	-	
274 Plumed, brown	graſs	-	Aug.	
275 Pinion, white ſpotted	elm, incloſed in leaves	June 25	July 5	1 1/4
276 Pinion, double ſpotted	-	-	May 8	1 1/4
277 Pit, chalk	-	-	July	1 1/4

Haunts in the winged ſtate.	Upper ſide deſcribed	LINNEAN Names.
264 Woods -		
265 Woods -	Brown, having a broad bar and a ſmall ring in the middle; wings dentated.	
266 Burdocks -	Orange colour, like gravel and a brown border.	
267 Woods -		
268 Woods -	Brown with two dark lines croſs the ſuperior wing.	
269 -		
270 Lanes -		
271 Willow bark -	Brown, having a large oval ſpot of darker brown, in the middle.	Zeczac 61
272 Barks of trees -	White, and covered with black freckles as if pepper'd.	Betularia 217
273 -		
274 Woods -	Narrow winged, and brown	Pentadactyla 459
275 On elm trees in hanging wood	Fine brown, having three triangular cream colour ſpots on the ſector edge.	
276 -	Brown, having two white ſpots on the ſector edge.	
277 In chalk pits -		

ENGLISH Names.	Food of the caterpillar	Change into chryſalis	Appears in the winged ſtate.	Expands Inches
278 Plumed, white -	nettles	June 5	June 19	1½
279 Plumed, gray -	-	-	Sept.	1¼
280 Plumed, twenty -	-	July Sept.	Aug. May	½
281 Prominent -	-	Sep. 29	May	1½
282 Prominent, ruſty -	willow	-	June	1½
283 Prominent, dark -	oak	-	June	1¼
284 Prominent, pale -	-	Aug. 1	May 23	1¼
285 Puſs, ſmall, or Kitten	black thorn and willow	Aug.	May	1¼
286 Puſs -	aſpin and willow	Aug. 1	May 23	3¼
287 Quaker -	garden ſtuff of various ſorts	Aug.	Mar. 2	1¼
288 Roſe -	in the buds of roſes	-	-	1
289 Red neck -	oak	-	June 10	1¼
290 Renunculus -	renunculus	-	-	
291 Sallow -	ſallow	June	Sep.	1¼

Haunts in the winged ſtate	Upper ſide deſcribed	LINNEAN Names.
278 Among nettles -	White and narrow winged.	Didactyla 454
279 Garden pales -	Grey and narrow winged.	Teſſeradactyla 456
280 Houſe windows -	Brown and mottled, the wings like the ſticks of a fan.	Hexadactyla 460
281 -	Hath a ſmall peice projecting, from the ſlip edge of inferior wing.	
282 Norwood -	Superior wings of a fox colour, inferior buff colour.	
283 Woods -	Dark brown, having ſome whitiſh markings.	Camelina 80
284 -	This is of a grey colour and pretty ſcarce.	
285 Lanes -	Marked like the puſs.	
286 Barks of trees -	White, having a great number of black lines in the form of gothic arches, as if tabbied.	Vinula 29
287 Garden pales -	Of a plain brown colour, having a ſmall ring in the middle, and a whitiſh line near the edge.	
288 Gardens -		Salicella 367
289 Woods -	Black, having a red colour and the lower end of the abdomen yellow.	Rubricollis 113
290 Gardens -		
291 Sallows -	Yellow with red ſpots.	Citrago 189

ENGLISH Names.	Food of the caterpillar	Change into chryſalis	Appears in the winged ſtate	Expands Inches
292 Sattin -	willow	June 20	July 15	2
293 Scollop'd oak -	oak	-	-	1 1/2
294 Seraphim -	-	-	-	
295 Shades, angled -	nettles	Ap. 24 May 12	June 1 Sep. 15	2 1/4
296 Shades, angled likneſs	-	June 14	July 14	
297 Shades, ſmall angled, or Chevalier	-	May 28	June 28	1 1/2
298 Shell, red -	oak	Sept.	March	
299 Shell, ſcollop'd -	oak	May	June 15	1 1/2
300 Shipton -	graſs	-	May 20	1 1/4
301 Shark -	-	May 25	June 25	2
302 Snout -	oak	-	June 12	1
303 Speck, lime -	African marigold	Aug. 20	June 20	1
304 Spot, white -	maple	April June	May 27 July 1	1
305 Spot, gold -	water graſs	July 20	Aug. 16	1 3/4

Uſual haunts in the winged ſtate	Upper ſide deſcribed	LINNEAN Names.
292 Willow bark	White like ſattin, legs ſpeckled with black.	Salicis 46
293 Woods -		
294 -		
295 Nettles -	Brown, and large triangular olive ſpots.	Meticuloſa 132
296 -	Something ſimiliar to the above.	
297 Pales	Brown, with a dark triangular ſpot or bar which croſſeth the middle of the wing.	
298 Under oaks -		
299 Woods ſides -	Pale brown, full of fine lines cloſe and parrellel to each.	
300 Meadows near woods	Superior brown, with white markings, inferior black with yellow dotted bars.	
301 - -	Grey having fine ſtreaks along the wing parrellel to each other.	
302 Woods -	Pale brown, having very long palpi.	
303 Gardens -	White, hath a broad border like lace, and a dark brown cloud in the middle of the wing.	
304 Woods -	Black having two white round ſpots in each wing.	
305 Ditches near marſhes	Brown, having ſome marks on the wing like drops of gold.	Feſtucæ 131

ENGLISH Names.	Food of the caterpillar	Change into the chrysalis	Appears in the winged state.	Expands Inches
306 Spectacle -	mint	Ap. 20	June 20	1 1/2
307 Straw bar'd, scollop'd	-	-	-	
308 Sparkling, gray -	oak, elm	-	June	3/4
309 Sparling, orange -	oak, elm	-	June	3/4
310 Straw, clouded -	oak	-	-	3/4
311 Stone, mocha -	white thorn	April	May 1	1
312 Stone, pale mocha	white thorn	-	-	1
313 Streak -	-	-	Oct. 6	
314 Streamer -	white thorn	-	Ap. 21	1
315 Stripe, white -	-	-	May	
316 Stripe, shoulder -	white thorn	-	May	
317 Stripe, yellow shoulder	white thorn	April	May 18	1
318 Stripe, cream dot	elder, sunflower, &c.	Aug. 18	May 15	1 3/4
319 Sweeper, large chimney	brambles	-	June 23	1

Haunts in the winged ſtate.	Upper ſide deſcribed	LINNEAN Names.
306 Gardens -	The part next the ſhoulder and the outer or fan edge light greeniſh brown, the middle dark clouded.	
307 -		
308 Gardens on the bodies of trees	Superior gray, with a br. cloud near the ſhoulder; fan membranes covered with a dark brown ſpot ſtriped with gold.	
309 Ditto -	Wings ſuperior orange, ſtriped with ſilver; large dark cloud in middle, ſtreak'd with white lines.	
310 -	Straw colour having an angular brown bar in the fan edge.	
311 Lanes -	White, having a ſcolloped broad bar acroſs and ſmall ring in the middle of the wing.	
312 Lanes -	Like the former, but pale.	
313 Furs and broom in the evening		
314 Lanes and hedges	White moth, having a bar of brown near the thorax and another waving like a narrow flag near the tip.	
315 Woods -		
316 Woods -		
317 Hedges and lanes -	Yellow, full of waved ſtripes of dark yellow.	
318 Gardens	Cream colour, having lines of black dotes.	Lubricipeda 69
319 Woods	Black, with white tips.	Chærophylla-ta 237

ENGLISH Names.	Food of the caterpillar	Change into chryſalis	Appears in the winged ſtate.	Expands Inches.
320 Sweeper, ſmall chimney	-	-	July	½
321 Swallow -	-	May	June	2
322 Swift, large evening	roots of graſs	May	June	2½
323 Swift, common ſmall	roots of graſs	May 1	May 10	1¼
324 Swift, golden -	roots of graſs	May	June	1½
325 Sychamore -	ſychamore	Sept	June 12	1¾
326 Sychamore likneſs	willow	May	June	1½
327 Spider -	hazle, oak	Aug. 20	May 30	2
328 Tabby -	-	-	June	1½
329 Tail, brown -	white thorn and oak	June 30	July 23	1¾
330 Tail, fringe -	-	-	-	
331 Tail, yellow -	black thorn	June 10	July 20	1¼
332 Tail, ſwallow -	white thorn,	May	June	2½
333 Teazle -	teazle	May 20	June 6	¾

	Haunts in the winged ſtate.	Upper ſide deſcribed	LINNEAN Names.
320	Woods -	Black.	
321	Pales	Dead white, daſhed with dark brown on the ſector edge of the wing.	
322	Meadows	Brown, clouded with br. ſpots.	
323	Meadows	Brown, with whitiſh dotes placed in ſtripes.	
324	Meadows	Orange brown, with dark ſpots; two bars meet in an angle at ſector edge.	
325	Near ſycamores	Gray prettily freckled with brown, with a mark like a dagger near the thorax.	Aceris 137
326	Willow bark	Gray, but no dagger like ſpot.	
327	Woods -	Brown, variegated with dark brown.	
328	Stables -	Brown, tinged with dark brown, and appears very gloſſy.	
329	Hedges and lanes -	White, having a tuft at the tail brown.	
330	-		
331	Hedges -	White, having a yellow tuft at the anus.	
332	Lanes -	Of a brimſtone colour, having two bars thro' all the wings.	Sambucaria 203
333	Lanes -	Whitiſh brown, variegated with dark browns.	

ENGLISH Names.	Food of the caterpillar	Change into chryſalis	Appears in the winged ſtate	Expands Inches
334 Tip, braſs hook	-	-	June	$\frac{1}{3}$
335 Thorn -	white thorn	April	May	$1\frac{1}{2}$
336 Tipt, buff -	oak, oſiers	Sep. 15	May 31	$2\frac{3}{4}$
337 Tip, buft likeneſs	-	-	June	$\frac{3}{4}$
338 Tip, broom buft	broom	-	-	
339 Tip, chocolate	birch	Sept. 24	Mar. 19	$1\frac{3}{4}$
340 Tip, bar'd hook	oak	Sept.	May	$\frac{3}{4}$
341 Tip, brown hook	oak	Sept 20	May	$1\frac{3}{4}$
342 Tip, orange hook	lalach	-	-	$\frac{3}{4}$
343 Tip, pibble hook	oak	-	June	$1\frac{3}{4}$
344 Tip, purple hook	lalach	May	June	$\frac{3}{4}$
345 Tip, ſcallap hook	oak	May	June	$1\frac{1}{2}$
346 Tip, ſcorched hook	lalach	June	Aug.	$\frac{3}{4}$
347 Tuſſock, nut-tree	hazle	Sep. 15	April 5	$1\frac{3}{4}$

	Haunts in the winged ſtate.	Upper ſide deſcribed	LINNEAN Names.
334	Woods -	Yellow buff, having few markings.	
335	Lanes and hedges	Pale orange, bar'd with brown.	Prunaria 208
336	-	Grave ſilver colour daſhed with brown; a large ſpot on each tip, buff colour.	Bucephala 31
337	Lanes and houſes		
338	Heaths -	Brown, having a large buff colour ſpot at the tip.	
339	Woods -	Brown, having a large ſpot at the tip of a chocolate colour.	Curtula 52
340	Woods -	Yellow brown, with three broad brown bars.	
341	Woods -	Yellow brown, having two large brown bars.	Lacertinaria 204
342	Gardens -	Orange colour, the edge of the wing as if ſcorched.	
343	Belvidere -	Light brown, with a number of brown lines, and a black ſpot in the middle.	
344	Gardens -	Dark purple colour.	
345	Woods -		
346	Gardens -	Dark brown, the markings on the wings divided into ſmall ſquares like brick work.	
347	Woods -	Grayiſh brown, having a broad bar in the middle, wherein is a round ring.	Coryli 50

ENGLISH Names.	Food of the caterpillar	Change into chryſalis	Appears in the winged ſtate.	Expands Inches
348 Triangle -	white thorn	April	May 2	1 1/4
349 Tuſſock, dark	white thorn	Sep. 26 May 20	May 7 July 20	2
350 Tuſſock, grey	oak	-	July 20	
351 Tuſſock, orange, or ſcarce vapourer	hazle	May 27 *Male* 16	June 10	1 1/4
352 Tuſſock, pale	oak	Sep. 12	Octob.	2 1/2
353 Tiger, cream ſpot	Chickweed	Ap. 29	May 29	2 3/4
354 Tiger, large	nettles	May 29	June 30	3
355 Tiger, ruby	ragwort	June	July	1 1/4
356 Tiger, ſcarlet	hounſtongue & nettles	May 13	June 10	2 1/2
357 Tiger, ſmall -	nettles, chickweed	Ap. 24	May 31	1 1/2
358 Thorn, Yorkſhire	-	-	May	1
359 Tip, ſmall hook	oak	-	June	1/2
360 Tap, nettle -	nettles	May 20	May 12	1/2
361 Tiſſue -	oak, elm	-	June	

Uſual haunts in the winged ſtate	Upper ſide deſcribed	LINNEAN Names.
348 Lanes -	White, having a triangular ſpot in the ſuperior wing	
349 Lanes -	Dark gray, having two bars of orange mixed with bl.	Faſelina 55
350 Woods -		
351 Woods -	Dark orange; white ſpot in corner of wing, with black lead lines near the body.	Gonoſtigma 57
352 Woods -	Pale yellowiſh colour, with two feint bars croſs the wing.	Pudibunda 54
353 Banks which face the riſing ſun	Superior black, large ſpots of a cream colour; Inferior yellow ſpotted with black.	Villica 41
354 Banks -	Superior of a cream colour clouded with dark brown; inferior ſcarlet with round ſpots of black.	Caja 38
355 Banks -	Superior wings red brown; inferior roſe colour.	Fuliginoſa 95
356 Charton in Kent	Superior wings green ſpotted with cream colour; inferior ſcarlet with black ſpots.	Dominula 90
357 Banks -	Cream colour clouded with black, inferior wings yellow ſpotted with black.	Plantaginis 42
358 -	Pale orange, with bars of brown.	
359 Woods -	Brown, having two dark bars.	
360 Banks -	Gray, mottled with brown.	
361 Woods -	Light brown, with feint markings, but very gloſſy.	

ENGLISH Names.	Food of the caterpillar	Change into the chryſalis	Appears in the winged ſtate.	Expands Inches
362 Vein'd, blood	white thorn and oak	April	May	1
363 Vapourer, common	lime-tree	Aug. 13	*Female* Aug. 20	1 1/4
364 Vanear -	brambles	May	June	1
365 Vanear, purple	-	-	-	1
366 Vanear, ruſh	ruſhes	May	July	
367 Vanear, ſilver	graſs	April	May	
368 Vanear, ſtriped	graſs	May	June	
369 Vanear, yellow	graſs	May	June	
370 Vein'd, black	white thorn,	-	June 18	1 1/2
371 Umber, waved	oak	-	April	2 1/4
372 Umber, mottled	oak	June 26	Nov. 5	2 1/4
373 Underwing, white	-	-	July	1
374 Underwing, large yellow	graſs roots	May	Aug.	2 1/4
375 Underwing, beautiful yellow -	heath broom	cat. all winter	end of June	1

Haunts in the winged ſtate	Upper ſide deſcribed	LINNEAN Names.
362 Lanes and woods	Lightiſh gray, having an oblique red bar croſs the wings.	
363 Lime trees -	Dark brown, with a white ſpot on the corner of the wing.	Antiqua 56
364 Woods and lanes		
365 - -		
366 Ponds -		
367 Gardens -		
368 Woods -		
369 Woods -	Wings yellow, ſtriped with brown.	
370 Near woods -	White, all the tendons bl.	
371 Woods -	Yellow brown, with waved bars of dark brown.	
372 Woods -	Yellow, motled or freckled with dark brown.	
373 Lanes -		
374 Gardens -	Superior brown, a mark like a human ear in the middle; inferior yellow bordered with black.	Pronuba 121
375 Belvidere wood near Earith	Superior wings red marbled with yellow.	

ENGLISH Names.	Food of the caterpillar	Change into chryſalis	Appears in the winged ſtate.	Expands Inches
376 Underwing Aug. yellow.	graſs roots	July	Aug.	1 1/2
377 Underwing third yellow	graſs roots	May	June	1 1/4
378 Underwing, broad bordered yellow	graſs roots	May 15	June 26	2 1/4
379 Underwing, leaſt yellow	graſs	April	May 15	3/4
380 Underwing, yellow companion,	meadows	July	Aug.	
381 Underwing, bloſſom	nettles	Sept.	Mar.	
382 Underwing, crimſon	high oaks	May 26	July 2	3
383 Underwing, copper	ſallow, oak	June 2	July 12	2 1/4
384 Underwing, copper, companion	-	-	-	1 1/2
385 Underwing, orange	poplar	Octob.	April 1	1 1/2
386 Underwing, orange companion	-	Octob.	April 1	
387 Underwing, pale white	-	-	July	
388 Underwing, pink	ragwort	Aug. 6	May 18	1 3/4
389 Underwing, red	willow	July 10	Aug. 2	3 1/2

Haunts in the winged ſtate.	Upper ſide deſcribed	LINNEAN Names
376 Meadows -	Superior wings pale brown.	
377 Meadows -	Superior wings red brown.	
378 Meadows -	Broad black border on the inferior wings.	
379 Meadows -	Brown clouded with black and a black border very broad.	
380 Meadows -		
381 Lanes -	Superior wings brown, under wing pale purple.	
382 Burnt wood -	Superior brown, variegated with deep brown; inferior crimſon, with two bl. bars.	Nupta 119
383 Woods -	Superior brown, inferior of a copper colour.	
384 -		
385 Woods, Hornſey	Superior wing brown, inferior orange with black ſpots.	
386 Woods -		
387 Woods -		
388 Commons -	Superior ſoot colour, with one ſtreak and two ſpots of red; inferior wings pink.	Jacobææ 111
389 Willow bark -	Superior gray, dappled with brown; inferior red with two black bars.	Pacta 120

ENGLISH Names.	Food of the caterpillar	Change into chryſalis	Appears in the winged ſtate	Expands Inches
390 Underwing, ſtraw colour'd	-	-	May	
391 Upperwing, orange	oak	June 15	July 29	1½
392 Uſher, ſpring	oak	May 16	Feb. 28	1¾
393 Wing, black marked narrow wing	-	-	-	1¼
394 Weeper -	-	-	-	
395 Wainſcott -	great ſword graſs	May & June	Aug.	1¼
396 Wing, march cloſe	oak	Sep.	Mar. 9	¾
397 Waved beautiful	-	-	July 6	
398 Waved hornſey	-	-	Mar. 4	1½
399 Wing, graſs cloſe	graſs	May	June	1¼
400 Woolen, moth	woolen	April	May	
401 Waved, pale	white thorn	May 1	May 17	1¼
402 Way, milkey	-	-	July 8	
403 Wing, ſcorched	white thorn	May 27	June 16	1½

	Haunts in the winged ſtate.	Upper ſide deſcribed	LINNEAN Names.
390	-		
391	Woods -	Superior orange, inferior pale buff.	
392	Woods -	Pale brown clouded with dark brown.	
393	-		
394	-		
395	Marſhes -	Wainſcott colour.	
396	Woods -	Superior wing half black, and the other half white.	
397	-		
398	Hornſey lane -	Whitiſh, prettily waved with brown.	
399	Meadows -	Pale brown, having ſome angular marks at the tips.	Culmella 361
400	-		Sarcitella 373
401	Hedges in lanes -	White, having ſome feint grayiſh bars.	Lactearia 194
402	Lanes		
403	Lanes	Yellow buff, daſhed with brown, the edges of the wings as if ſcorched.	

ENGLISH Names.	Food of the caterpillar	Change into chryſalis	Appears in the winged ſtate.	Expands Inches
404 Wing, ſcorched like	-	-	-	1 1/2
405 Wing, croſs -	elm	Ap. 20	May 14	1 1/4
406 Wing, waved croſs	-	-	Mar. 19	1 1/2
407 Waved white -	white thorn	May	June	1
408 Y moth -	nettles	-	Sep.	1 3/4
409 Y golden -	-	-	June	1 3/4
410 Y ſcarce ſilver	-	-	-	1 3/4
411 White, double ſpotted	-	-	June	1
412 Yellow, ſmall clouded	broom	May 26	June 26	1
413 Yellow, ſpeckled	-	-	May 12	1 1/4
414 Yellow, or brimſtone	white thorn	Sep.	May 23	1 3/4
415 Yellow, froſted	elms	Sep. July	May 7 Aug 12	1 1/4

Haunts in the winged ſtate	Upper ſide deſcribed	LINNEAN Names.
404 Lanes near woods	Similar to the above, but not ſo ſtrongly marked.	
405 -	Buff colour, having a diagonal line from the tip, and a dark ſpot in the middle of the wing.	
406 Againſt pales -		
407 Hedges -	Whitiſh, with two brownish bars croſſing each wing	
408 Graſs in meadows	Brown, having a mark in the middle of the wing like the letter Y.	Interrogationis 129
409 -	Red brown, having a golden Y in the middle of the wing.	Gamma 127
410 Yorkſhire -	Purple, having the ſame mark in the middle as above.	
411 -	Brown, having two white ſpots on the edge of the wing.	
412 Commons -	Strong yellow, having a broad brown bar croſs the wing.	
413 Woods -	Yellow, full of black ſpots.	
414 Lanes -	Yellow, with red triangular ſpots, and a white ſpot in the middle.	Cratægata 243
415 Hedges -	Yellow, having a broad black border, freckled on under ſide.	

AN

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INSTRUCTIONS

FOR

COLLECTING AND PRESERVING

INSECTS,

PARTICULARLY

MOTHS AND BUTTERFLIES.

Illustrated with a COPPER-PLATE,

On which the NETS, and other APPARATUS necessary for that Purpose, are delineated.

——*quod alii Venationibus, Confabulationibus Tesseris, Chartis, Lusibus, Compotationibus insumunt, illud ego Animalculis indagandis, colendis, contemplandis impendo.*

RAY.

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1771

PREFACE.

THE following inſtructions were originally drawn up for a gentleman going to reſide abroad, partly with a view of collecting the various productions of nature, particularly inſects.

Moſt of the Engliſh as well as Foreign inſects, in the collections which I have lately had opportunities of obſerving, have been either ſpoiled in the catching, or, for want of properly know-

knowing how to preſerve them, rendered imperfect, and of little or no value.

I regretted that ſo much time and labour ſhould be ſpent to ſo little purpoſe; and for that reaſon was induced to make theſe inſtructions, with ſome additions, more generally known; from which it is hoped that ſome advantage may reſult, not only to the young Aurelian and Entomologiſt, but that they may excite to a more general inveſtigation of the inſects of this country.

IN-

INSTRUCTIONS

FOR

COLLECTING AND PRESERVING

INSECTS.

Of Insects in General.

THIS little treatise being intended for those who are altogether unacquainted with insects, as well as for those who have made them their particular study, it may not be amiss to premise a short account of the nature of insects in general.

Almost every insect, from the largest beetle to the smallest mite, is originally

produced from an egg; which the female, guided by unerring inſtinct, depoſits in ſome place capable of affording it proper and ſufficient nouriſhment in its future ſtate: the places to which they are committed are many and various, and ſtrikingly diſplay the wiſdom of an all-wiſe Providence.

Some depoſit them on the various parts of plants, ſome commit them to the earth, and others to the waters; ſome depoſit them on putrid fleſh, others in the bodies of living animals, even of inſects themſelves.

After a period more or leſs ſhort, the little Larvæ, Caterpillars, or Maggots, come forth; and feeding on their deſtined food till they are arrived at their full growth, change into the Chryſalis or Aurelia ſtate. In this they remain

remain ſome time longer; during which they are for the moſt part inactive; and laſtly come forth in their perfect or fly ſtate, when they propagate their ſpecies and die.

Butterflies and moths being not only one of the moſt numerous, but the moſt beautiful claſs of inſects, whether we conſider the variety or richneſs of their colours, and from the peculiar delicacy of their ſtructure requiring more care to be uſed in catching as well as in preſerving them, we choſe firſt to ſpeak of, and to be more particular in our directions concerning them.

There are two methods of collecting inſects of this kind; firſt, by breeding, 2dly, by catching them in their fly ſtate. Of theſe the former is much to

be preferred; as, beſides the pleaſure which ariſes from obſerving the gradual progreſs of the inſect, from its egg or caterpillar to its perfect or fly ſtate, we can kill them before they have in the leaſt injured the farina or meal of their wings by flying.

The difficulty likewiſe of procuring the moſt beautiful and valuable inſects of this claſs in their fly ſtate, makes this method much the moſt eligible. Moſt of the Sphinges of Linnæus, or Hawk Moths as they are called, are very ſeldom ſeen in their fly ſtate, and when ſeen on the wing generally elude the ſwifteſt purſuit; but in their caterpillar ſtate they are often found, and eaſily taken. Thus the Sphinx * Atropos

* We have uſed on this occaſion the names of the celebrated Sir Charles Linnæus; a name dear to

pos (Jeſſamine Hawk Moth) the largeſt and one of the moſt beautiful ſpecies of moth this country produces, is frequently found feeding on the Jeſſamine and Potatoe; the Sphinx Elpenor, or Elephant Hawk Moth, on the Galium Paluſtre, or White Ladies Bed Straw; the Sphinx Ocellata, or Eyed Hawk, on the Willow; Sphinx Tiliæ, or Lime Hawk Moth, on the Lime tree; Sphinx Liguſtri, or Privet Hawk Moth, on the Privet; Phalæna Pavonia, or Emperor Moth, on the Briar, Blackthorn, &c. and ſo of a great number of others.

---

to every naturaliſt, and whoſe candour, genius and induſtry can never be too much admired. It were to be wiſhed that our Engliſh names were in general equally expreſſive.

Method

Method of collecting them in their Caterpillar State.

Beſides the method of collecting caterpillars by attentively examining the leaves and other parts of plants at different times of the year, there is another ; viz. by beating the boughs of trees, particularly the taller ones, with long poles, ſpreading a large ſheet underneath to receive them.

By this means many very valuable caterpillars are ofter caught, which would with great difficulty be procured by any other means.

Caterpillars ſhould be handled as little as poſſible ; the more hairy ones are in general the leaſt hurt by it. It will be neceſſary to carry a box in the pocket,

pocket, partly filled with leaves, to put them in.

Method of rearing them.

The caterpillars being procured, our next endeavour is to rear them. For this purpoſe they are to be ſupplied with ſome of the plant they are found feeding on. Although many of them live on a variety of food, the greateſt part are attached to ſome particular kind, deprived of which they would ſoon periſh.

To ſave the unneceſſary trouble of ſupplying them with freſh food every day, ſeveral ſprigs of the tree or plant are to be put into a wide mouth'd glaſs filled with water, and the caterpillars placed on them. Moſt plants may in this manner be preſerved freſh for three

three or four days. The glaſs, together with the caterpillars and their food, is to be placed in the breeding box repreſented in the plate, and a conſtant ſupply of freſh food is to be given them as ſoon as the former appears in the leaſt withered.

After they are arrived at their full growth, they will leave off eating, and either immediately or very ſoon change into chryſalis; previous to which, Butterflies ſpin a little web, juſt ſufficient to ſuſpend themſelves by; many of the moths, like the ſilkworm, ſpin a large web, in which they enwrap themſelves; and a great number work themſelves into the earth, where they ſpin themſelves caſes, or change without any ſpinning; as do moſt of the Sphinges or Hawk Moths. It will therefore be neceſſary to cover the bottom

tom of the box with fine mould to the depth of three or four inches, and keep it conſtantly moiſt.

It frequently happens that Caterpillars are what the Aurelians call ſtung; that is, have the eggs of the Ichneumon Fly depoſited in them: in ſuch caſe, the eggs are generally hatched before the caterpillar goes into chryſalis. The Larvæ or Maggots of the fly being arrived at their full growth, eat their way out of the body of the caterpillar, and, enwrapping themſelves in little caſes of their own ſpinning, change into chryſalis; and in this ſtate have been conſidered as the Eggs of the caterpillar, by perſons unacquainted with inſects. The caterpillar, having afforded ſubſiſtence to its natural enemy, dies.

Caterpillars, previous to their going into chryſalis, generally loſe the brilliancy of their colours, and many of them rove about for a conſiderable time.

After remaining in their chryſalis ſtate till near the time of their coming forth, ſuch as are incloſed in a hard caſe or ſpinning, as the Phalæna, Vinula, Puſs Moth, Phalæna Quercus, &c. are to be carefully freed from it; as the aperture which the Inſect naturally makes, is often too narrow for it to paſs out without conſiderably injuring its plumage. The opening will be beſt made by cutting off the largeſt extremity of the caſe, taking care not to wound the incloſed Pupa or Chryſalis.

Method

Method of collecting them in their Chryſalis State.

Butterflies and Moths may often be found in chryſalis under the projections of garden walls, pales, outhouſes, in ſummer-houſes, &c. and frequently on their food.

A great variety of Moths in this ſtate may with more certainty be found by digging in the winter months under the trees which they feed on, particularly under the Oak, Willow, Lime, and Elm Trees. When they are dug up in this manner, they are to be placed as ſoon as convenient in a box, ſuch as is repreſented in the plate, and kept covered with moiſt earth till the enſuing ſpring, when they may be dug

up, and placed within a few inches of the ſurface of the mould, and in that manner left to come out of themſelves.

It frequently happens, that if we are not ſo fortunate as to collect any Chryſalis's, we are amply recompenſed by the variety of Beetles we thus dig up.

Method of collecting them in their Fly State.

The delicacy of the wings of theſe Inſects will not admit of their being caught without injury but in Nets made of the fineſt materials.

The collector then ſhould in the firſt place furniſh himſelf with a net adapted to this purpoſe: that which is repreſented in the plate, has on repeated

repeated trials been found to anſwer beſt. (Vide explanation of the plate.) The net ſhould be made of fine gauſe, having its ſtiffening taken off by being ſoaked a little while in warm water; or if dyed of a green colour, which is common, this will be unneceſſary.

He is next to provide himſelf with two or three large oval boxes for the pockets, lined at top and bottom with thin cork; and a pin-cuſhion well ſtored with pins of various ſizes.

Being thus furniſhed with proper inſtruments, we ſhall proceed to give him ſuch inſtructions as may enable him to uſe them with ſucceſs.

It is particularly to be obſerved, that there is a continual ſucceſſion of Inſects

Inſects, as well as of Plants. Some appear with the early Primroſe, others accompany the late flowering Ivy. So that in this reſpect, the Aurelian and Entomologiſt may regulate their excurſions by thoſe of the Botaniſt. The latter would in vain ſearch for the Pilewort (Ranunculus Ficaria) in the month of July; and the former be equally diſappointed in ſeeking after the Orange Tip (Papilio Cardamines) in the month of Auguſt.

Some of thoſe inſects continue longer in their fly ſtate, and their plumage is leſs hurt by flying than others. Some continue a few days only; others ſeveral weeks. In general Moths and Butterflies, unleſs they are caught the firſt day of their coming out of Chryſalis, are worth little: hence ariſes the neceſſity of our

care-

carefully watching thoſe particular times, and of making frequent excurſions, to have them in the greateſt perfection.

Butterflies are to be caught on the wing only when the ſun ſhines warm. They inhabit a variety of places. The greateſt number of them frequent woods, and may be taken in or near them; as the Papilio Iris, Populi, Hyperantus, and moſt if not all the Fritillaries. Some delight in meadows, as the Papilio Juſtina, Galathæa, Phlæas, Comma, &c. and others frequent gardens, clover fields, heaths, lanes, &c. Many of thoſe which frequent woods are taken with much greater facility in the morning, a few hours after ſun-riſe; at which time they are found feeding on the flowers that grow by the ſides of the woods:

after-

afterwards, when the ſun ſhines with more ſtrength, they fly high, and with ſuch ſwiftneſs as to be taken with the utmoſt difficulty.

Moths fly chiefly in the evening, a little after ſun-ſet. Like Butterflies, they inhabit a variety of places, and are to be met with in the greateſt plenty near woods. They may alſo be taken in great numbers in the day-time by beating the hedges, &c. more particularly in the afternoon, as the leaſt motion will then put them on the wing. They are likewiſe frequently met with in the day-time ſticking to the bark of trees, on walls and pales that ſurround gardens, &c. and may be thus caught in great perfection. Some few, like the Butterflies, fly in the middle

of

of the day when the ſun ſhines warm.

The ingenious naturaliſt, Geoffroy, informs us that Moths may be taken in great plenty by means of a Candle and Lanthorn carried into or near ſome wood towards dark; that the moths immediately fly to the light, and are caught with great facility.

We cannot recommend this method from our own experience; but, from the propenſity we frequently obſerve in Moths to fly towards, and even into, lighted candles, we apprehend it to be a very eligible one.

An expertneſs in uſing the Net is attained by practice only.

Having taken the Butterfly or Moth in the Net, we are to proceed with caution; as on killing it properly, its beauty in a great meaſure depends. We are not to take hold of it indiſcriminately in any part; but are, by means of the net, to bring its wings, if poſſible, into an erect poſition, and then preſs the under part of the thorax or breaſt betwixt the thumb and forefinger ſufficiently hard to kill it: by this means the wings are neither diſtorted, nor their plumage injured.

The net being then opened, the inſect is to be laid hold of gently by one of the horns, and again placed betwixt the thumb and forefinger, in which ſituation it is to be held while a pin, proportioned to its ſize, is ſtuck through the upper part of the thorax

thorax or back. The inſect is then to be placed in the pocket box.

Method of managing them in their Fly State; as Setting, Preſerving them, &c.

Though the inſects may by this means be caught uninjured, ſomething further is neceſſary to make them appear to advantage. This is called ſetting them, and is done in the following manner:

The inſect being ſtuck through with a pin of a proper ſize, is to be placed, before its wings are become ſtiff, on a piece of cork having a ſmooth ſurface, and covered with white paper. The body of the fly ſhould not be made to touch the cork, when ſtuck into it, but to ſtand up

ſome little diſtance from it. (It being only the edges of both wings that are to ſit cloſe to the cork, not the wings to lie flat on it.) The wings are then to be expanded (Vide Plate) with a fine needle, or ſome ſharp-pointed inſtrument.

The upper edge of the ſuperior wings is to be placed in a line with the head of the inſect; and they are to be kept in this ſituation by means of little braces, made of card paper, cut in the ſhape repreſented in the Plate. Theſe muſt be proportioned to the ſize of the wings, and fitted to their ſhape, by being more or leſs bent. By theſe means, the ſpots, &c. on both wings are made conſpicuous, and the inſect appears to much greater advantage.

To

To ſet them well, however, requires conſiderable practice, and ſome ingenuity.

After remaining in this poſition four or five days, or till it is become thoroughly ſtiff, the braces may be taken off, and the inſect removed into the ſtore box; which ſhould be ſo conſtructed, as effectually to ſeclude thoſe little inſects, which are ſo apt to infeſt and deſtroy collections of this kind. The ſhape of the ſtore box is immaterial; that which is repreſented in the plate is ſimple, and anſwers every purpoſe. The inſide of it ſhould be lined with thin cork; and ſome ſlips of cloth glued to its edges to make it ſhut cloſer.

If, notwithſtanding theſe precautions, inſects ſhould get among them (which

(which the fine powder, that falls from and ſurrounds ſuch inſects as are attacked, quickly diſcovers) immerſing them in rectified ſpirits of wine immediately kills them without injuring the fly. And if a little corroſive ſublimate be diſſolved in the ſpirit they are immerſed in, it will prevent them from any future attacks.

Camphire kept in the boxes is alſo a good preventative.

The flies may be either kept in boxes of this kind, or in ſuch cabinets as the collector may think proper. The bottom of the drawers, if in cabinets, ſhould alſo be lined with thin cork, covered with white paper.

Me-

Method of collecting Inſects of the Beetle Kind.

§. I.

By inſects of the Beetle kind, we mean all ſuch as have thin membranous wings covered with hard caſes or ſhells, and included in Linnæus's firſt claſs of inſects, COLEOPTERA. Theſe have generally been termed Scarabæi, or Beetles: ſome few of them have obtained diſtinct Engliſh names, as the Chafer, Lady-bird, Earwig, &c. and all have been divided by Linnæus into Genera and Species.

The inſects of this, as well as of the preceding and following claſſes, may be found in their Caterpillar or Grub ſtate, in which they are often extremely deſtructive to the roots of plants; and may in like manner be brought to their perfect or fly ſtate, regard being had to their

their different manner of feeding. The time and care, however, required for this purpoſe, is probably more than can be ſpared by the generality of collectors: we would nevertheleſs wiſh the curious Entomologiſt, who has both leiſure and abilities for this purpoſe, to engage in purſuits of this kind, as being the only means of eſtabliſhing with certainty the different Genera of Inſects.

The inſects of this claſs are in general eaſily collected in their fly ſtate. Some creep and fly in the day-time when the ſun ſhines warm; others, like the moths, fly in the evening and night only.

Their habitations are exceedingly diverſified. Some are found in the bodies of rotten trees, as the Lucanus Cervus,

Flying

Flying Stag, Scarabæus Cylindricus, and many of the Cerambyces: others among the dung of various animals, particularly of horſes and cows, as the Scarabæus Fimetarius, &c. Some reſide in the bodies of animals that are become putrid, as the Silpha Veſpillo; great numbers are found on the leaves and ſtalks of plants, as the Scarabæus Melolantha, Chafer, Coccinellæ, Lady-birds, Chryſomelæ Curculiones, &c. others delight more particularly in the flowers of plants, as the Scarabæus Auratus: ſome reſide altogether in woods, as many of the Cerambyces, and they are often found in great plenty under the bark of decayed trees: ſome are found ſwimming on the ſurface of ſtanding waters, as the Gyrinus Natator: others in pools, ditches, ponds, &c. as the Dytiſci: Some are diſcovered from the light which they emit, as the

Lampyris Noctiluca Glow-worm: and a vaſt quantity is found on dry banks, ſand banks, ſand pits, pathways, &c. particularly when the ſun ſhines warm.

Theſe inſects, as ſoon as caught, may, with a pin of a proper ſize, be ſtuck through the body, cloſe to the future that runs down the middle of the back, as repreſented in the plate (vide fig. 6) and then placed in the pocket box; taking care that they do not injure one another from being placed too cloſe together. Or if the collector be diſpoſed to procure this claſs of inſects, he will find it very convenient, and much leſs cruel, to carry a number of ſmall pill boxes in his pockets, in which the inſects may be readily ſecured and kept till he returns home, without ſuffering any pain. They are then to be immerſed in

in boiling water, as being the moſt ready means of killing them, and afterwards ſtuck through in the manner above-mentioned; being careful to make the pin paſs a ſufficient length through the body of the inſect, and then placed on a piece of ſmooth cork. When they have remained in this ſituation two, three, or four days, according to the ſize of the inſect, their legs, antennæ, &c. are to be extended with a pair of fine forceps or tweezers, and placed in a natural poſition; in which they will, if proper care be taken of them, always afterwards remain. They are then to be placed in the ſtore box.

§. II.

The next claſs of inſects is the HEMIPTERA.

The Genera contained in this claſs are principally theſe; viz. *Blatta*, Cockroach, *Mantis*, *Gryllus*, Locuſt, Graſshopper, Cricket; *Fulgora*, *Cicada*, *Notonecta*, *Nepa*, and *Cimex*, or Bug.

The firſt of theſe, the Blatta, like the bed bug *, has been imported from abroad, where they are equally numerous and troubleſome. † They are found

* Bugs, according to Southall, were ſcarce obſerved in England till after the fire of London, in 1666. It is ſuppoſed that they were then imported with the timber which the new houſes were built with.

† They are as troubleſome as they are common in the iſland of Senegal. Though they are ſcarce an

found in the greateſt plenty here in bake-houſes; particularly in the night, their uſual time of feeding.

All thoſe of the next genus, Mantis, are foreign; ſome of them are extremely remarkable and curious, and from their particular ſhape have been called Walking Leaves. They are found in the meadows, and on the leaves of plants and trees. The Grylli moſtly reſide in meadows and fields among the herbage. The miſchief done by the Blattæ is nothing, compared with the ravages of ſome of thoſe, viz.

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an inch thick, they do an incredible deal of miſchief. They gnaw linen, ſheets, wood, paper, books, and in ſhort whatever comes in their way: they attack even the Aloes, the bitterneſs of which keeps off all the other inſects.

Adanſon's Voyage to Senegal, p. 206.

viz. the Locuſts.* One ſpecies of this genus, the Gryllus Domeſticus, reſides in houſes, particularly where there are ovens.

* In this voyage (ſays Adanſon) I was witneſs myſelf, for the firſt time, to the miſchief done by Locuſts; that ſcourge ſo dreadful to hot climates! The third day after our arrival we were ſtill in the road, when there ſuddenly aroſe over our heads, towards eight o'clock in the morning, a thick cloud, which darkened the air, and deprived us of the rays of the Sun. Every body was ſurpriſed at ſo ſudden a change in the ſky, which is ſeldom overcaſt in this ſeaſon: but we ſoon found that it was owing to a cloud of Locuſts, raiſed about twenty or thirty fathoms from the ground, and covering an extent of ſeveral leagues; upon which it poured a ſhower of thoſe inſects, which fell to devouring while they reſted themſelves, and then reſumed their flight. This cloud was brought by a very ſtrong Eaſt wind; it was all the morning in paſſing over the adjacent country; and we imagined that the ſame wind drove the Locuſts into the ſea. They ſpread deſolation wherever they came; after devouring the herbage, with the fruits and leaves of trees,

ovens. Moſt of the Fulgoræ are diſcoverable from the light which they emit; theſe, like the Mantes, are foreign, and many of them equally curious. The Cicadæ are found on trees and plants; the Notonectæ and Nepæ reſide in ſtagnating waters. There is ſcarce a perſon who has lived a while in any very populous place, but knows where

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trees, they attacked even the buds and the very bark: they did not ſo much as ſpare the reeds with which the huts were thatched, notwithſtanding that theſe were ſo dry: in ſhort they did all the miſchief that can be dreaded from ſo voracious an inſect.

The inhabitants of Aſia, as well as Europe, ſometimes take the field againſt Locuſts, with all the dreadful apparatus of war. The Baſhaw of Tripoli in Syria ſome years ago raiſed 4000 ſoldiers againſt theſe inſects, and ordered thoſe to be hanged who refuſed to go.

Haſſelquiſt's Voyage to the Levant, &c.

where to find one ſpecies of the next genus, the Cimex or Bug, to particularize the places where the remaining ſpecies of this very numerous genus reſide, would be almoſt endleſs; they are in ſhort to be met with almoſt everywhere.

Theſe inſects may be killed either with boiling water, or a few drops of ſpirit of turpentine. They are all of them to be ſtuck through the thorax or back betwixt the ſhoulders. The wings of the Grylli, and ſome of the others, are to be expanded, and kept ſo by means of the little braces; and their legs, antennæ, &c. are alſo to be placed in a natural ſituation.

§. III. The

§. III.

The insects contained in the next class, NEUROPTERA, are chiefly aquatic, residing in the waters in their caterpillar state, and flying about them in their perfect state. The principal genera are, the Libellula, Dragon Fly, Ephemera, May Fly, Phryganea, Hemerobius, and Panorpa. The Libellulæ are considered by the generality of people as containing in them something venemous, and from hence have derived their several names of Adder Spear, Adder Bolt, Horse-stinger, &c. It must be confessed, that their shape, manner of flight, &c. is such as might readily raise such an idea: the collector, however, must not be misled by their appearance, and intimidated from catching them, they being perfectly harm-

leſs, indeed equally ſo with the Gnats they feed on.

The net uſed for catching Butterflies will be very convenient for catching the inſects of this claſs, particularly the Libellulæ.

They are all of them readily killed, either by ſqueezing their thorax, or with a few drops of ſpirit of turpentine. The ſame means are to be uſed in ſetting them, &c. as in the Hemiptera.

§. IV.

The inſects of the next claſs, HYMENOPTERA, are for the moſt part armed with ſtings, which are either venemous or harmleſs. The principal genera are the Tenthredo, Ichneumon; Sphex,

Sphex, Chryſis; Veſpa, *Waſp*, *Hornet*; Apis, *Bee*; Formica, *Ant*.

The Tenthredines are found on trees and flowers in their caterpillar ſtate: they feed on the leaves of plants. The Ichneumones are found in the ſame manner: in their caterpillar ſtate they live chiefly in the bodies of other inſects, particularly of the caterpillars of Moths and Butterflies, in which they depoſit their eggs. The Sphex reſides principally in ſand banks; it is alſo caught on flowers, &c. This inſect catches and kills others, which it buries in the ſand, having previouſly depoſited its eggs in them. The Chryſis, (many ſpecies of which are exceeding beautiful) is found flying about old walls, poſts, ſand banks, &c. in which it builds its neſt. *Waſps*, *Bees*, and *Ants* are found on

flowers and fruits, and almoſt on every thing that is ſweet.

Theſe inſects being armed many of them with poiſonous ſtings, it will be neceſſary to uſe the forcep nets to catch them with (vide fig. 7.) When caught, a pin is to be ſtuck through them while in the net (i. e. through the thorax, as in fig. 8.) It is very difficult to kill theſe inſects without injuring them in ſome reſpect; boiling water hurts their wing, and the fine hairs with which the bodies of many of them are covered; ſpirits of wine or turpentine proves immediately fatal to ſome, while others are ſcarce affected by it; and letting them remain transfixed till they are dead, will probably be thought too cruel.* We ſhall leave the collector

* The beſt method, as I have ſince been informed by an ingenious gentleman, is to ſtick them

tor to adopt either of theſe methods, or any other he pleaſes. When dead, their wings, &c. are to be expanded, and kept in as natural a poſition as poſſible.

§. V.

Inſects with two wings only, form the next claſs, DIPTERA: it contains various kinds of *flies* and *gnats*. There is ſcarce any place in which ſome of the former are not to be met with; but they are found more particularly on all kinds of plants and flowers, eſpecially on the umbelliferous ones. Some of them fly about cattle of various kind, in the ſkins of which they depoſit their eggs, as the Oeſtrus Bovis, &c. The latter moſtly

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them through with a needle dipt in aqua-fortis. The Sphinges, and other large Moths, are likewiſe killed in this manner with the leaſt injury.

moſtly fly about waters and watery places.

Theſe inſects are eaſily killed by a few drops of ſpirit of turpentine: their wings are to be expanded ſo as that their bodies may become apparent; and a little brace ſhould be placed underneath them, to prevent their bodies from being too much incurvated in drying, which they are very apt to be.

§. VI.

The inſects of the laſt claſs are ſuch as have no wings at all, and are therefore called, APTERA. *Spiders*, *Scorpions*, *Centipes*, and *Crabs* of various kinds, make up the principal part of this claſs. Theſe are ſo common, and the places they inhabit ſo generally known, that any information on the means

means of collecting them would be ſuperfluous.

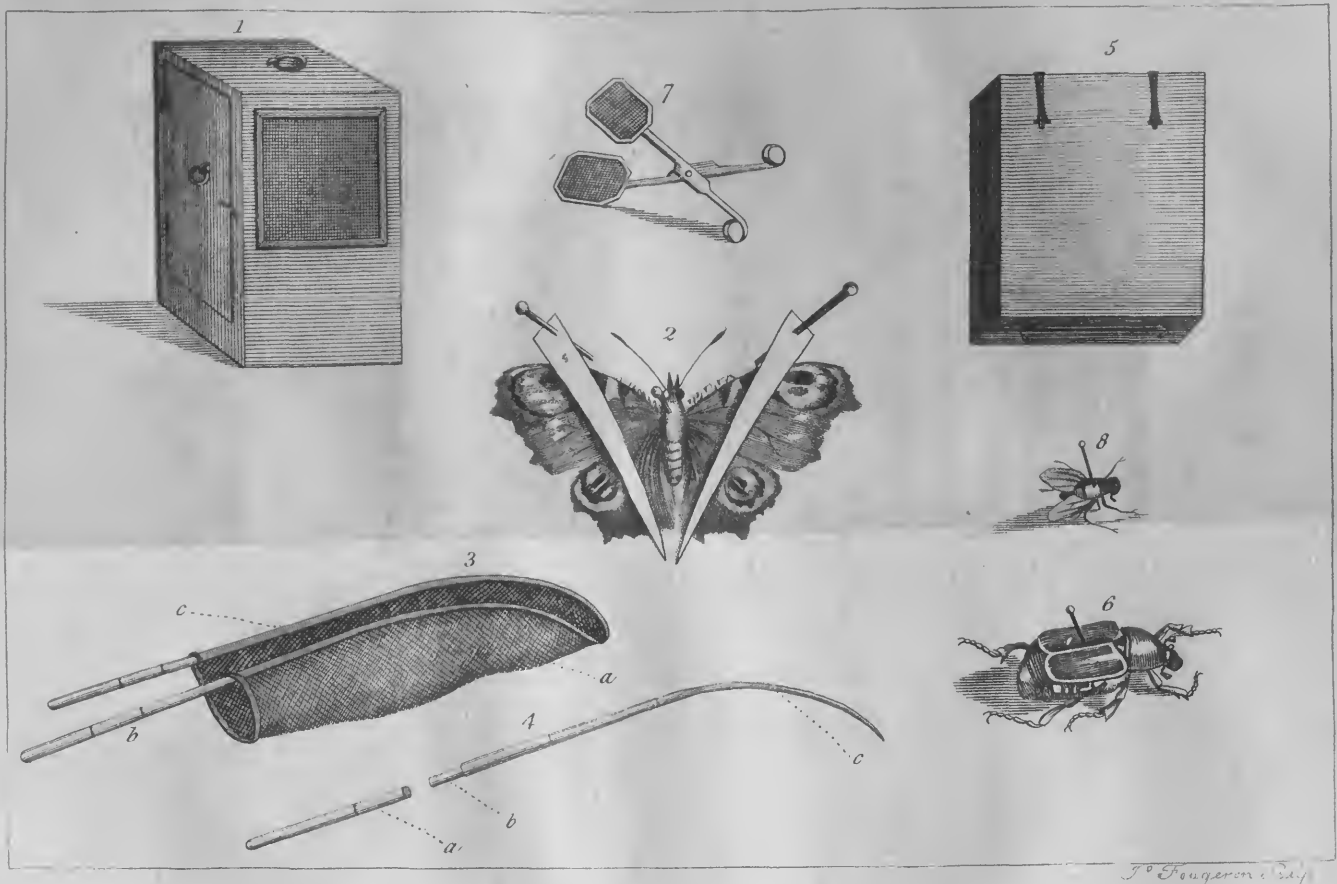
Moſt of them require to be preſerved in ſome kind of ſpirits, as ſpirits of wine, rum, brandy, &c. Such of them indeed as are incloſed in hard ſhells, may be preſerved dry, in the ſame manner as the inſects of the Beetle kind.

As the collector will have frequent occaſion for the uſe of cork, both to line his boxes with, and to ſet his inſects on, we ſhall informhim how to prepare it for uſe.

He may procure the cork in large pieces at any of the cork-cutters. Theſe muſt be cut into ſmaller ones; and in order to make the cork flat, it is held before the fire till it becomes hot

hot through; it is then to be immediately placed betwixt two ſmooth boards, and a very heavy weight laid on it, where it muſt remain till cold. Thus flattened, it is to be raſped on both ſides, with ſuch a raſp as is uſed by the bakers; afterwards with a finer one; and laſtly with a pumice ſtone, which makes it perfectly ſmooth. If the cork be thick, and the purpoſe of it to line boxes, it may be ſawed through the middle, and raſped on both ſides as before.

EXPLA-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EXPLANATION

OF THE

PLATE.

Fig. 1. The breeding box. *a*. an opening in the front, covered with gauſe; *b*. the door on the ſide.

N. B. The bottom of it ſhould be covered with fine mould to the depth of four or five inches. The ſhape and ſtructure of it need not be ſtrictly adhered to.

2. Shews the manner in which the wings of the Butterflies and Moths

are to be expanded, and how the braces are applied to keep them ſo.

3. The Net uſed for catching Moths, Butterflies, and other inſects. *a.* the part made of fine gauſe; *b.* the ſticks; *c.* the binding which receives them.

N. B. The ſticks, for the convenience of carrying them, are made to take to pieces, ſomewhat in the manner of fiſhing rods. They join to one another by means of hollow braſs ferrils fixed to the end of each. There are three of them, each of which is about fourteen inches long.

4. Shews one of the ſticks; *a.* the braſs ferril; *b.* the end of the next ſtick, which goes tight into it.

To

To the upper end of the ſticks is joined in like manner a piece of cane, about two foot long, bent of a proper ſhape, *c.* Inſtead of three pieces of wood here repreſented, the other ſtick may conſiſt of one entire piece, and be uſed as a walking-ſtick. The gauſe muſt be edged with two pieces of binding ſewed together to receive the ſticks; and as the ſticks are taper, ſo muſt be the cavity: at the upper part of it, where the ſticks meet, it muſt be cloſed by a few ſtitches, that the net ſticks may ſhut even together. The net may be about a yard broad when expanded, and the length of it a yard and a quarter. This ſize, however, may be varied at pleaſure.

5. The Store Box.

6. Shews

6. Shews the manner in which the Beetles, &c. are ſtuck through one of the wings.

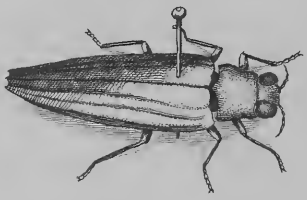
7. The Forcep Nets.

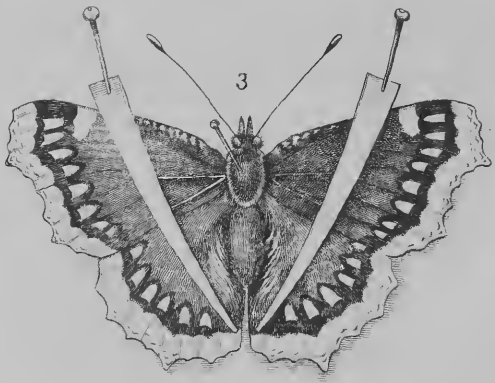
8. Shews a fly ſtuck through the thorax: and in the ſame manner all the different ſpecies of Bugs, Waſps, and Flies in Sect. II. III. IV. and V. are to be ſtuck.

FINIS.

Speedily will be publiſhed,

A Tranſlation of the FUNDAMENTA ENTOMOLOGIÆ of Linnæus; or, "An Introduction to the Knowledge of Inſects."





Mo.ᵗ Harris del et ſc.

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du Dr Maurice ROYER
M No 253, v

THE NATURALIST'S AND Traveller's Companion.

CONTAINING

Instructions for discovering and preserving

Objects of NATURAL HISTORY,

Under the following Heads:

I. The Method of catching and preserving Insects for Collections, illustrated with a Copper-plate.

II. The Method of preserving Birds and other Animals.

III. Directions for bringing over Seeds and Plants from distant Countries.

IV. Method of analysing Medicinal or Mineral Waters.

V. Experiments for discovering the Contents of the Air.

VI. Directions for collecting Fossils, including Earths, Stones, Salts, Inflammables, Minerals, and Metals.

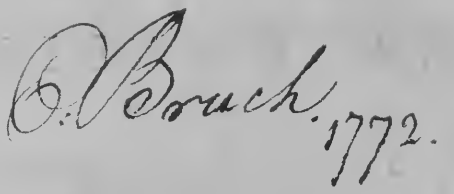
VII. Directions for taking off Impressions or Casts from Medals and Coins.

Multa etenim sunt quæ esse audivimus, qualia autem sint ignoremus! Quamque multa venientis ævi populus, ignota nobis, sciet!

SENECA.

LONDON:
Printed for the AUTHOR, and sold by GEORGE PEARCH, Cheapside.
MDCCLXXII.

7.12 Lettsom (J.C.)


C. Bruch. 1772.

PREFACE.

THE experienced Naturaliſt muſt not expect to find much Information in this little Treatiſe. The Author had kept it by him for ſome Time in Manuſcript, and occaſionally given Copies to Sea-faring Perſons, and ſuch of his Acquaintance going Abroad, as were deſirous of procuring the Natural Productions of different Countries. But this having neceſſarily confined it to a few Individuals, he has been induced to Publiſh it, that every Perſon might avail themſelves of any Inſtruction it affords, his ultimate Deſign having been to promote a more general Knowledge of Natural Hiſtory.

THE NATURALIST'S AND Traveller's Companion.

SECT. I.

The Method of catching and preſerving INSECTS *for Collections.*

INSECTS in general are known to moſt people, the ſyſtematic diſtinctions but to few; nor have we any Engliſh names for the greateſt part of them. The general denomination of beetles, butterflies, moths, flies, bees, waſps, and a few other common names, are all that our language ſupplies. It would, therefore, be in vain to enumerate the immenſe variety of genera and ſpecies to any perſon unſkilled in the ſcience of entomology: we may,

however, give directions under general names, where to find and how to catch each kind; and such as require more particular information upon this subject, may consult an ingenious treatise, which has appeared since the first publication of this, (*a*) under the title of *Instructions for collecting and preserving Insects, by W. Curtis* (*b*).

I. The first great class called beetles (*c*), are found in and under the dung (*d*) of animals, especially of cows, horses, and sheep: many of them make holes under the dung three or four inches deep; it will therefore be necessary to have an iron spade to dig them out, when in search of this tribe of insects.

Some (*e*) are found in rotten and half decayed wood, and under the decayed bark of trees; on the carcases (*f*) of animals that have been dead four or five days; on moist bones that have been gnawed by dogs or other animals; on flowers having a fœtid smell; and on several kinds

(*a*) Gentleman's Magazine, vol. XLI. 1771, page 6. It may be necessary to observe, that the following classes and genera of insects are made after the Linnæan system.

(*b*) See also Chaeffer Elementa Entomologica; Forster's catalogue of the animals of North America.

(*c*) COLEOPTERA. (*d*) Scarabæus, *chafer*. Dermestes, *leather-eater*. Hister, *mimick-beetle*. Staphylinus, *rove-beetle*. (*e*) Lucanus, *stag-beetle*. Cerambyx, *capricorn-beetle*. Dermestes. (*f*) Hister, Silpha, *carrion-beetle*. Staphylinus.

(*g*) Byrrhus,

kinds of fungous ſubſtances, particularly the rotten and moſt ſtinking: others (*g*) may be found in a morning about the bottoms of perpendicular rocks and ſand banks, and alſo upon the flowers of trees and herbaceous plants.

Many kinds (*h*) may be caught in rivers, lakes, and ſtanding pools, by means of a thread net, with ſmall meſhes, on a round wire hoop, fixed at the end of a long pole.

In the middle of the day, when the ſun ſhines hot, ſome (*i*) are to be ſeen on plants and flowers, blighted trees and ſhrubs; others (*k*) in moiſt meadows are beſt diſcovered at night, by the ſhining light which they emit.

A great variety (*l*) ſit cloſe on the leaves of plants, particularly of the burdock, elecampane, coltsfoot, dock, thiſtle, and the like; or feed on different kinds of tender herbs (*m*).

Numbers (*n*) may be found in houſes, dark cellars, damp pits, caves, and ſubterrancous paſſages, or on umbelliferous flowers (*o*), on the trunks

(*g*) Byrrhus, curculio, *weevil*. Bruchus, *ſeed-beetle*. (*h*) Gyrinus, *whirl-beetle*. Dytiſcus, *water-beetle*. (*i*) Coccinella, *lady-fly*. Bupreſtis, *burn-cow*. Chryſomela, *golden-honey-beetle*. Cantharis, *ſoft-winged-beetle*. Elater, *ſpring-beetle*. Necydalis, *clipt-winged-beetle*. (*k*) Lampyris, *glow-worm*. (*l*) Caſſida, *tortoiſe-beetle*. (*m*) Meloë, *bliſter-beetle*. (*n*) Tenebrio, *ſtinking-beetle*. (*o*) Cerambyx, Ptinus.

 (*p*) Leptura,

trunks as well as the leaves of trees; in timber-yards, and in the holes of decayed wood.

Some (*p*) inhabit wild commons, the margins of pools, marſhes, and rivulets; and are likewiſe ſeen creeping on flags, reeds, and all kinds of water-plants.

Multitudes (*q*) live under ſtones, moſs, rubbiſh, and wrecks near the ſhores of lakes and rivers. Theſe are found alſo in bogs, marſhes, moiſt places, pits, and holes of the earth, on ſtems of trees; and in an evening they crawl plentifully along path-ways after a ſhower of rain.

Some (*r*) may be diſcovered in the hollow ſtems of decayed umbelliferous plants, and on many ſorts of flowers and fruits.

II. Another claſs (*s*) of inſects are found about (*t*) bake-houſes, corn-mills, in ſhips, and in all places where meal is kept; on graſs (*u*), and all kinds of field herbage. Some (*v*) of theſe frequent rivers, lakes, and ſtanding-pools.

III. Butterflies and moths make another great

(*p*) Leptura, *wood-beetle*. Cicindela, *gloſſy-beetle*. (*q*) Carabus, *ground-beetle*. (*r*) Forficula, *earwig*.

(*s*) HEMIPTERA. (*t*) Blatta, *cock-roach*. (*u*) Mantis, *camel-cricket*. Gryllus, *locuſt*. Fulgora, cicada, *flea-locuſt*. Cimex, *bug*. (*v*) Notonecta, *boat-fly*. Nepa, *water-ſcorpion*.

diviſion (*w*). In the day when the ſun is warm, butterflies (*x*) are ſeen on many ſorts of trees, ſhrubs, plants, and flowers. Moths (*y*) may be ſeen in the day time, ſitting on walls, pales, trunks of trees, in ſhades, out-houſes, dry holes, and crevices; on fine evenings they fly plentifully about the places they inhabit in the day time: ſome (*z*) are ſeen flying in the day time over the flowers of honey-ſuckles and other plants with tubular flowers. Inſects of this ſpecies ſeldom ſit to feed, but continue vibrating on the wing, while they thruſt the tongue or proboſcis into the flower.

IV. Inſects of this claſs (*a*) are found in woods (*b*), hedges, meadows, ſand-banks, walls, pales, fruits, and umbelliferous flowers; ſome (*c*) fly about lakes and rivers in the day.

V. The fifth diviſion (*d*) including waſps (*e*), bees (*f*), *&c.* may be ſeen about hedges (*g*), ſhrubs, flowers, and fruits. Waſps and bees are the only winged inſects that have any great degree

(*w*) LEPIDOPTERA. (*x*) Papilio, *butterfly*. (*y*) Phalæna, *moth*. (*z*) Sphinx, *hawk-moth*.

(*a*) NEUROPTERA. (*b*) Myrmeleon, hemerobius, *pearl-fly*. Raphidia, *camel-fly*. (*c*) Libellula, *dragon-fly*. Ephemera, *may-fly*. Phryganea, *ſpring-fly*.

(*d*) HYMENOPTERA. (*e*) Veſpa, *waſp*. (*f*) Apis, *bee*. (*g*) Tenthredo, *ſaw-fly*. Sirex, *tailed-waſp*. Ichneumon, *ichneumon-fly*. Sphex, *ichneumon-waſp*. Veſpa. Apis.

(*b*) Mutilla,

degree of poiſon in them, they ſhould therefore be taken with a pair of forceps, and handled cautiouſly on account of their ſtings, which are dangerous. Some (*h*) of this diviſion have ſtings, but no poiſon, and are to be found on the flowers of umbelliferous plants, when the ſun ſhines hot in the middle of the day, at which time others (*i*) are ſeen on ſand-banks, walls, and pales.

VI. Flies of various kinds conſtitute the next claſs (*k*); they fly about the tops of trees (*l*), little hills, horſes, cows, ſheep, ditches, dung-hills, and every offenſive object. Some (*m*) are found on all ſorts of flowers, particularly thoſe of a fœtid ſmell. Many (*n*) of theſe are moſt eaſily taken when they begin to feed; for in the middle of the day they are ſo quick and active, that it is almoſt impoſſible to catch them.

VII. The laſt great diviſion (*o*) contains ſcorpions, ſpiders, crabs, lobſters, *&c.* It is neceſſary only to obſerve here, that all kinds of inſects having no wings may be preſerved in ſpirits, brandy or rum, except crabs, lobſters,

(*h*) Mutilla, *naked-bee.* (*i*) Chryſis.

(*k*) DIPTERA. (*l*) Oeſtrus, *gad-fly.* Muſca, *fly.* Tabanus, *wheame.* Hippoboſca, *horſe-fly.* (*m*) Tipula. Conops. Aſilus, *waſp-fly.* (*n*) Bombylius, *flower-breeze.*

(*o*) APTERA.

and

and the like, which may conveniently be preſerved dry.

I. The firſt claſs of inſects, conſiſting of beetles (coleoptera) are hard winged. Many kinds fly about in the day, others in the evening, ſome at night only. They may be caught with a gauze net, or a pair of forceps covered with gauze. When they are taken, ſtick a pin thro' the middle of one of the hard wings, and paſs it through the body, as in plate, fig. 1. They may be killed inſtantly, by immerſion in hot water, as well as in ſpirit of wine; then ſtick them on a piece of cork, and afterwards carefully place their legs in a creeping poſition, and let them continue expoſed to the air until all the moiſture is evaporated from their bodies. Beetles may alſo be preſerved in ſpirit of wine, brandy, or rum, cloſely corked up.

II. Inſects of the ſecond claſs (hemiptera) may be killed in the ſame manner as beetles, and likewiſe by means of a drop of the etherial oil of turpentine applied to the head.

III. The diviſion of butterflies and moths (lepidoptera) as well as all flies with thin membranaceous wings, ſhould be catched with a gauze net, or a pair of gauze forceps: when taken in the forceps, run a pin through the thorax or ſhoulders, between the forewings, as in plate, fig. 3. After this is done, take the pin by the head, and remove the forceps, and with the other

other hand pinch the breaſt of the inſect, and it will immediately die: the wings of butterflies ſhould be expanded, and kept ſo, by the preſſure of ſmall ſlips of paper, for a day or two. Moths expand their wings when at reſt, and they will naturally take that poſition.

The beſt method of having the moſt perfect butterflies is to find out, if poſſible, the larva or caterpillar of each, by examining the plants, ſhrubs, or trees they uſually feed upon, or by beating the ſhrubs and trees with long poles, and thereby ſhaking the caterpillars into a ſheet ſpread underneath to receive them; to put them into boxes covered with thin canvas, gauze, or cat-gut, and to feed them with the freſh leaves of the tree or herb, on which they are found; when they are full grown, they will go into the pupa, or chryſalis ſtate, and require then no other care, till they come out a perfect butterfly, at which time they may be killed, as before directed. Sometimes theſe inſects may be found hanging to walls, pales, and branches of trees, in the chryſalis ſtate.

Moths might likewiſe be procured more perfect, by collecting the caterpillars, and breeding them in the ſame manner as butterflies. As the larvæ or caterpillars cannot be preſerved dry, nor very well kept in ſpirit, it would be ſatisfactory if exact drawings could be made of them while they are alive and perfect. It may be neceſſary

neceſſary to obſerve, that in breeding theſe kinds of inſects, ſome earth ſhould be put into the boxes, as likewiſe ſome rotten wood in the corners; becauſe, when the caterpillars change into the pupa, or chryſalis ſtate, ſome go into the earth, and continue under ground for many months before they come out into the moth ſtate; and ſome cover themſelves with a hard ſhell, made up of ſmall pieces of rotten wood. Hence alſo, as many go into the earth, valuable inſects may ſometimes be found by digging after them a foot deep, about the roots of trees, ſhrubs, and plants.

IV. The fourth claſs of inſects (neuroptera) may be killed with ſpirit, or with a drop of ætherial oil of turpentine.

V. Inſects of the next claſs (hymenoptera) are beſt killed by oil of turpentine alſo. A pin may be run through one of their wing-ſhells and body, as repreſented in plate, fig. 2.

VI. Thoſe of the ſixth claſs (diptera) may be killed with ſpirit of wine.

VII. The laſt diviſion (aptera) in general are ſubjects which ſhould be kept in ſpirit.

When in ſearch of inſects, we ſhould have a box ſuitable to carry in the pocket, lined with cork at the bottom and top to ſtick them upon, until they are brought home. If this box be ſtrongly impregnated with camphor, the inſects ſoon become ſtupefied, and are thereby prevented

from fluttering and injuring their plumage. Beſides a gauze forceps, the collector ſhould have a large muſcheto gauze net, made in the ſhape of a bat fowling-net, and alſo a pincuſhion with three or four different ſizes of pins, to ſuit the different ſizes of inſects.

In hot climates, inſects of every kind, but particularly the larger, are liable to be eaten by ants and other ſmall inſects, eſpecially before they are perfectly dry: to avoid this, the piece of cork on which our inſects are ſtuck in order to be dried, ſhould be ſuſpended from the cieling of a room, by means of a ſlender ſtring or thread; beſmear this thread with bird-lime, or ſome adheſive ſubſtance, to intercept the rapacious vermin of theſe climes in their paſſage along the thread.

After our inſects are properly dried, they may be placed in the cabinet or boxes where they are to remain: theſe boxes ſhould be kept dry, and alſo made to ſhut very cloſe to prevent ſmall inſects from deſtroying them; the bottoms of the boxes ſhould be covered with pitch, or green wax, over which paper may be laid; or, which is better, lined with cork, well impregnated with a ſolution of a quarter of an ounce of corroſive ſublimate mercury, in half that quantity of ætherial oil of turpentine, and a pint of the camphorated ſpirit of wine.

The

The fineſt collections have been ruined by ſmall inſects, and it is impoſſible to have our cabinets too ſecure. Such inſects as are thus attacked may be immerſed in ſpirit of wine, without injuring their fine plumage or colours; and afterwards let them be ſprinkled about their bodies and inſertions of the wings with the ſolution above-mentioned. We may diſſolve a much larger proportion of ſublimate mercury, by means of a ſaturated ſolution of crude ſal ammoniac in water: I find that an ounce of the ſal ammoniac ſolution will diſſolve twenty ſcruples of the ſublimate.

Theſe obſervations and directions reſpecting inſects, may, perhaps, be the means of exciting the curioſity of ſome, whoſe enquiries after this part of natural hiſtory will be amply compenſated by the frequent opportunities of enlarging their knowledge, as there is ſcarce any part of the ſurface of this globe, ſcarce a tree, a ſhrub, or a plant, an animal either living or dead, or even the excrements of animals, on which ſome kind of inſect does not depend for its ſubſiſtance and propagation. An inquiſitive traveller, as well as every other perſon, has it more or leſs in his power to add to the common ſtock of knowledge, with very little expence either of time or labour.

SECT. II.

Method of preſerving BIRDS *and other Animals.*

THE general increaſe of knowledge of late in natural hiſtory, from the attention of individuals to various branches of it, muſt afford no ſmall degree of pleaſure to the ſenſible part of mankind. Whilſt ſuch different reſearches have given entertainment to different diſpoſitions, enlarged the mind, and engaged and diverted it from unprofitable or dangerous purſuits, they have occaſionally given riſe to the moſt uſeful improvements in every department of life, and afforded means of joining utility with elegance.

To promote theſe purpoſes more effectually, a more general knowledge of a good antiſeptic for animal ſubſtances has been much enquired after. Owing to a want of this, many curious animals, and birds particularly, come to our hands in a very imperfect ſtate: ſome from foreign parts entirely miſcarry, and others of the fineſt plumage are devoured by inſects.

Many

Many ſubjects I have prepared myſelf with ſucceſs; but ſince the firſt inſertion of this account in the Gentleman's Magazine *, the methods uſed by the ingenious captain Davis, and T. S. Kuckahn, have been publiſhed in the Philoſophical Tranſactions †, of which I ſhall alſo avail myſelf.

The former directs birds in perfect plumage, "to be opened from the upper part of the "breaſt, to the vent, with a ſharp knife or "pair of ſciſſars, the feathers of the breaſt and "belly being firſt carefully laid aſide by the fin-"gers, ſo as not to hinder the ſkin being eaſily "come at. The ſkin muſt then be carefully "looſened from all the fleſhy parts of the breaſt, "body, thighs, and wings; after this, cut off "all the fleſh from thoſe parts, and take out "alſo the entrails and all the inſide: then, hav-"ing got a compoſition of burnt alum, cam-"phor, and cinnamon, of each an equal quan-"tity, well powdered and mixt together, ſtrew "ſome of this powder lightly over the whole "carcaſe; but ſalt is by no means to be uſed "with this compoſition, as it always will drop "and naſty the plumage in moiſt weather; pour "alſo into the body a ſmall quantity of camphor

* Vol. XL. 1770, page 293.

† Vol. IX. anno 1770, page 184, and 302. From the ſpecimens both theſe methods appear to ſucceed.

"diſſolved

" diſſolved in rectified ſpirits of wine; after " that, fill up the cavity with fine cotton, or " any ſoft woolly ſubſtance, pouring ſome of " the aforeſaid ſpirits into the cotton or ſtuffing. " Open next the mouth, and with a pair of ſciſ- " ſars take away the tongue, the roof of the " mouth, eyes, brains, and inſide of the head *; " fill that alſo with the ſame compoſition; and " having procured eyes as near the natural ones " as poſſible, put them into the ſockets by means " of a ſmall pair of nippers introduced at the " mouth. The eyes will be beſt made by letting " fall ſome drops of black ſealing wax on a card " of the ſize of the natural ones †; the card " muſt be cut ſomething larger than the wax, " to prevent their falling out of the head. Fill " the head quite full with cotton, pouring ſome " of the ſpirits down the throat, with ſome of " the powder; a ſmall piece of braſs wire, that " has been heated in the fire to make it pliable, " may be put down the throat, being paſſed

* Kuckahn directs the neck to be pulled within the ſkin, till the back of the ſkull is drawn in ſight, out of which a ſmall piece is to be cut, and the brains extracted; the cavity of the ſkull is then to be moiſtened with the varniſh, ſprinkled with the powder, and filled up with cotton, &c. and then the ſkin may be drawn back to its proper place.

† To anſwer this purpoſe, beads may be conveniently introduced, by means of a needle and thread, paſſing the needle through the mouth, and out at the eye.

" through

" through one of the noſtrils, and faſtened to " the breaſt-bone, to place the head in any atti- " tude you chooſe; next fill up the body, where " the fleſh has been taken away, with cotton " and your compoſition; and, having a fine " needle and ſilk, ſew up the ſkin, beginning " at the breaſt, obſerving, as you approach to- " wards the vent, to ſtuff the ſkin as tight as it " will bear. This will be eaſieſt accompliſhed " by means of a ſmall piece of ſtick or ivory, " like a ſkewer, till the whole is done: then lay " your feathers of the breaſt and belly in their " proper order, and your bird will be com- " pleated. If you would chuſe to put it into an " attitude, by introducing a ſmall piece of the " wire above-mentioned through the ſole of " each foot up the leg, and into the pinion of " each wing, it may be diſpoſed of as you " pleaſe."

Inſtead of uſing the ſolution of camphor in ſpirit of wine, Kuckahn recommends a liquid varniſh, made of two pounds of common or raw turpentine, one pound of camphor, and one pound of ſpirit of turpentine. The camphor is to be broke into very ſmall pieces, and the whole is to be put into a glaſs veſſel, open at top, which is to be placed in a ſand heat, till the ingredients are perfectly diſſolved *.

For

* The ſolution of corroſive ſublimate, Sect. I. page 3, would

For the dry compound of cinnamon, burnt alum, and camphor, directed in the foregoing method, he ſubſtitutes the two following compoſitions.

Corroſive ſublimate, — —	¼ lb.
Saltpetre prepared or burnt,	½ lb.
Alum burnt, — —	¼ lb.
Flowers of ſulphur, — —	½ lb.
Muſk *, — — —	¼ lb.
Black pepper, — — —	1 lb.
Tobacco ground coarſe. —	1 lb.

Mix the whole together, and keep it in a glaſs veſſel ſtopped cloſe. Some of this is to be ſtrewed upon the inſide of the ſkin and cavity of the head, after they have been waſhed with the varniſh.

The other dry compoſition is made of equal quantities of tanſy, wormwood, hops, and tobacco, which are to be cut ſmall and mixed together; with this the cavities of the craw and body are to be ſtuffed. He likewiſe directs an artificial breaſt to be made of ſoft wood, and

would probably prove more effectual againſt inſects than this varniſh, or the camphorated ſpirit.

* The muſk renders this compoſition very expenſive, for which the ſame quantity of camphor might be ſubſtituted with real advantage.

fitted

fitted to the proper place, after being moiſtened with the varniſh *.

When theſe antiſeptic powders before mentioned cannot be had, tobacco ſand mixed with a ſmall proportion of alum, black pepper, and camphor may be ſubſtituted. If the ſublimate ſolution (Sect. II. page 16.) can be procured, the abdomen and throat of the animal may be firſt waſhed with it, and the tobacco, oakum, or tow, ſteeped alſo in the ſame liquor.

Small birds are well preſerved in brandy, rum, arrack, or firſt runnings, the fineſt plumage not being injured by ſpirits.

Large ſea-fowl have thick, ſtrong ſkins, and ſuch may be ſkinned; the tail, claws, head, and feet are carefully to be preſerved, and the plumage ſtained as little as poſſible with blood. The inſide of the ſkin may be moiſtened with the ſublimate ſolution, and then ſtuffed with oakum, tow, or tobacco ſteeped in the ſame, and afterwards dried in an oven, not heated ſufficiently to criſp the feathers. The eyes may be filled with white putty, which, when dry, may be painted

* I am informed that both Leman's and Grace's curious collections were preſerved with cork breaſts. I have found that this gives the ſubjects a plumpneſs, which cannot be equalled by tow, or any ſtuffing; though it muſt be admitted, that the ſpecimen exhibited before the Royal Society by captain Davis, can be exceeded by nothing but life itſelf.

to reſemble the natural eyes. " Baking is not " only uſeful in freſh preſervations, but will alſo " be of very great ſervice to old ones, deſtroy- " ing the eggs of inſects; and it ſhould be a " conſtant practice once in two or three years, " to bake them over again, and to have the " caſes freſh waſhed with camphorated ſpirit, " or the ſublimate ſolution, which would not " only preſerve collections from decay much " longer, but alſo keep them ſweet *."

When the ſubject is to be kept ſome time in a hot climate, it ſhould be ſecured in a box filled with tow, oakum, or tobacco, well ſprinkled with the ſublimate ſolution. The ſame preparations and precautions already deſcribed, are equally applicable to quadrupeds in general.

Small quadrupeds, all kinds of reptiles, as ſnakes, lizards, and frogs; fiſh of all ſorts, and ſmall tortoiſes, with ſea eggs †, and ſea ſtars, may be put into brandy, rum, arrack, or firſt runnings, with a little alum in it.

Shells conſtitute an extenſive part of natural hiſtory, and may be collected in great plenty and variety on the ſhores of moſt iſlands and continents. Thoſe which are found with the fiſh in

* See Philoſophical Tranſactions, vol. LX. page 319.

† The echini, or ſea eggs, may alſo be dried; but they are then ſo liable to be broken, that the ſafeſt method is to preſerve them in ſpirit.

them,

them, are the moſt valuable for the brightneſs of colour, and ſmoothneſs of ſurface, as they loſe that beauty and poliſh, when they have been long expoſed to the ſun. In bivalves, or thoſe having double ſhells, as cockles, oyſters, *&c.* both the ſhells ſhould always be collected. It is ſufficient in packing up ſhells, to prevent their rubbing againſt each other by means of paper, moſs, ſand, *&c.* ſome of the ſhell fiſh may be preſerved in ſpirits, as this might prove an uſeful addition to the knowledge of this department of natural hiſtory.

The neſts and eggs of birds, would likewiſe contribute to increaſe the knowledge of natural hiſtory, and prove alſo highly ornamental amongſt collections in that branch of zoology.

SECT. III.

Directions for bringing over SEEDS *and* PLANTS *from diſtant Countries.*

EVERY part of the world has its peculiar productions, and in no objects of natural hiſtory is the variety more entertaining, than in the vegetable kingdom. The gardens of the curious have already been enriched with many valuable acquiſitions from diſtant countries; but many attempts alſo to introduce ſeveral other plants equally rare, have been unſucceſsfully made, owing to the bad ſtate of the ſeeds or plants when firſt procured, or the method of diſpoſing of them during long voyages, and the accidents which the utmoſt precaution cannot prevent. The ingenious J. Ellis, Eſq; has favoured the world with the moſt judicious obſervations on the preſent ſubject, which may ſoon prove the means of many uſeful additions in horticulture to this kingdom. He directs ſound ripe ſeeds to be choſen, which have been collected in dry weather, and kept dry without expoſing

expoſing them to ſunſhine; and internally they ſhould be plump, white, and moiſt.

a. They may be preſerved by rolling each in a coat of yellow bees wax, about half an inch thick; and afterwards a number of theſe thus prepared, may be put into a chip box, which is to be filled with melted bees wax, not made too hot *: the outſide of the box may then be waſhed with the ſublimate ſolution, (Sect. II. page 16.) and kept during the paſſage in a cool airy place. In this manner tea ſeeds, the ſtones of mangoes, and all hard nuts and leguminous ſeeds in general, may be prepared.

b. Inſtead of putting ſmall ſeeds in bees wax, they may be incloſed in paper or cotton which has been firſt ſteeped in melted bees wax, and then placed in layers in a chip box, which is to be filled as before with melted bees wax. Pulpy

* Inſtead of melted bees wax, plaſter of Paris, mixed with water, (Sect. VII.) and poured upon the nuts, ſeeds, &c. may be ſubſtituted. I ſhall not lay much ſtreſs at preſent upon this method, becauſe I never knew it tried; but from analogy it appears to me preferable to any other for preſerving ſuch ſubſtances in a ſtate fit for vegetation. The coat formed by plaſter of Paris excludes air and moiſture; and at the ſame time is ſufficiently porous to abſorb the exhalation from the vegetable included. Another advantage is, that it may be applied cold. It alſo remains of the ſame conſiſtence in all climates, and under all degrees of heat of the air. I would therefore recommend a trial of this cheap body.

ſeeds, as thoſe of ſtrawberries, mulberries, arbutuſes, &c. may be ſqueezed together and dried, and then put into the cerate paper or cotton above-mentioned.

c. The ſmall ſeeds well dried may be mixed with dry ſand, put into the cerate paper or cotton, and packed in glaſs bottles, which may be covered with a bladder or leather. Theſe bottles may be put into a keg, box, or any other veſſel, filled with four parts of common ſalt, two of ſaltpetre, and one part of ſal armoniac, in order to keep the ſeeds cool, and preſerve their vegetative power.

d. Seeds and nuts in their pods, may be put, with alternate layers of ſilk paper, into half-pound caniſters with double rim covers, made of tin and tutenague, and lined with the ſame paper: theſe ſhould be well covered with paper at the top, and kept in an airy cool place.

e. The ſeeds well dried may be put into a box, not made too cloſe, upon alternate layers of moſs, in ſuch a manner as to admit the ſeeds to vegetate, or ſhoot their ſmall tendrils into the moſs. In the voyage, the box may be hung up at the roof of the cabin; and when arrived here, the ſeeds ſhould be put into pots of mold, with a little of the moſs alſo about them, on which they had lain.

Seeds preſerved after this manner, and alſo in the preceding (d), which are procured in the

Eaſt

Eaſt Indies, may be examined when the ſhip arrives at St. Helena; and ſome of them which appear in a ſtate of vegetation, ſhould be ſown in caſes or tubs of earth kept as ſecure as poſſible from ſea water; ſome holes ſhould be cut in theſe caſes or tubs, and covered with baſt-mats or ſail-cloth, which will admit ſufficient air.

More of the ſame ſeeds may be alſo ſown after the ſhip has paſſed the tropic of Cancer, near the latitude of thirty degrees north. Plants or ſhrubs that are to be tranſported, muſt be taken out of the ground with a quantity of the ſoil covering the roots, which ſhould be wrapped in wet moſs, and ſurrounded with a baſt-mat, or dry plantain leaves, and put into the caſes or tubs, with the precautions above-mentioned.

When the naturaliſt is in ſearch of vegetable productions, different ſoils and ſituations ſhould be examined; as the ſea, and its ſhore, deep running waters, dikes, marſhes, moors, mountains, cultivated and barren fields, woods, rocks, *&c.* afford each their peculiar plants; and wherever any are collected, the particular ſoil and ſituation ſhould be remarked. Sometimes it may prove inconvenient to convey the plants which may be diſcovered, when it would not be ſo to ſend them dried in the form of a hortus-ſiccus. To do this in the beſt manner, and to make their ſtalks, leaves, *&c.* lie flat and ſmooth,

they

they muſt be expoſed betwixt papers to a free dry air, with conſiderable preſſure upon them. The leaves and flowers ſhould be carefully expanded, for on this the beauty and value of the ſpecimen greatly depends. Thoſe plants ſhould alſo be gathered on a dry day, while they are in full bloom, and all their parts perfect and entire. When perfectly dry, they may be kept either looſe in quires of paper, or faſtened into a book, with glew made of fine iſinglaſs diſſolved in boiling water. Particular care is to be taken to avoid any injuries from moiſture, or inſects; to prevent any accident from the latter, let the paper and ſtalks of the plants be ſprinkled with the ſublimate ſolution. (Sect. II. page 16.)

The impreſſions of plants well taken off upon paper, look very little inferior to the beſt drawings, and may be done with very little trouble. For this purpoſe, ſome printer's ink *, and a pair of printer's boſſes, ſuch as are uſed for laying the ink on types, are neceſſary. After rubbing theſe boſſes with a little of the ink, lay the plant betwixt them, and preſs it ſo as to give it ſufficient colour; then take the plant and lay it carefully on a ſheet of paper, and preſs it with the hand, to give the impreſſion of the plant to the paper, which may be afterwards coloured accord-

* Where this cannot be procured, ivory, or lamp black, ground with boiled linſeed oil, may be ſubſtituted.

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ing to nature; a piece of blotting paper may be placed betwixt the plant and the hand, to prevent the latter from being dirtied by the ink.

But the moſt effectual method of ſending a branch of any plant with the flowers, and parts of fructification entire and perfect, is to put them in bottles of brandy, rum, or arrack.

Corals, corallines, ſponges, *&c.* inhabitants of the ſea, are found in conſiderable variety near the coaſts of iſlands and continents, particularly in hot climates. Some of theſe are very tender and brittle when dry, and ſhould therefore be carefully packed up in ſand, in order to keep them ſteady, or placed betwixt papers in the manner of an hortus ſiccus.

In hot climates, the inſects are very rapacious; and I have ſeen the fineſt fan-corals, and others of a ſoft texture when firſt taken out of the ſea, almoſt devoured by ants, before they became dry and hard. To prevent injuries of this kind, a little powdered corroſive ſublimate, or the ſublimate ſolution (Sect. II. page 16.) may be ſprinkled upon theſe productions. Some of the ſmall, and branches of the large ones, might alſo be put into ſpirits, and the parts of them thereby preſerved much more diſtinct, which

would ſerve greatly to illuſtrate their natural hiſtory *.

* Though the author agrees with the ingenious J. Ellis, Eſq; in the propriety of ranking corals, corallines, &c. among the animal kingdom, he has placed them under this ſection, as they are uſually thought to be vegetable productions.

SECT. IV.

Method of analyzing MEDICINAL WATERS.

AS many ſprings contain a volatile principle, ſoon liable to be diſſipated, it is neceſſary to make our experiments on the ſpot, in order to diſcover the contens of ſuch waters. Various as theſe contents may at firſt appear, the apparatus proper to detect all of them may be reduced into a very ſmall compaſs.

When we purpoſe to examine any medicinal ſpring, the ſoil and face of the country ſhould be conſidered, the ſtony or mineral appearance, and particularly whether there are any mineral veins; the degree of heat of the water ſhould be aſcertained by a thermometer, and its comparative weight to other ſprings in the neighbourhood alſo carefully obſerved; after which we may enter on our experiments.

I. AERIAL MATTERS.

1. MEPHITIC, FIXABLE, or FIXED *air*, is heavier than common, or vital air, and frequently mixed with water; by which union, common water is capable of diſſolving iron, and thereby forming a chalybeate ſpring, as in Pyrmont, Spa, and many other celebrated mineral waters.

This mephitic air is detected by lime-water, the former precipitating the calcareous earth of the latter in a white powder. To diſcover the quantity of this aërial matter, a bottle filled with the mineral water, ſhould be tied over the mouth with a looſe bladder: the bottle is then to be placed in boiling water, the heat whereof will extricate the mephitic air, which riſing into the bladder, may be collected by tying the bladder cloſe to the neck of the bottle, and afterwards meaſured by a proportionable bulk of water. (See Sect. V.)

II. SALINE BODIES.

1. AN ACID is ſometimes found in the compoſition of mineral waters, which is always the vitriolic.

a. In

a. In its fixed ſtate, which is ſuppoſed to be ſeparated from pyrites: this is however very rare, and probably never occurs, as it cannot remain long in this ſtate, without being neutralized by earths, ſalts, or metals.

Many of thoſe ſprings called acidulæ, received this name from the mephitic air we have already mentioned. If this acid be preſent, it may be diſcovered by an infuſion or ſyrup of violets, or by an infuſion of lacmus, or archil *, which are turned of a brighter or reddiſh colour by it. This acid may be detected alſo by a ſolution of lead in the nitrous acid; the ſolution ſhould be fully ſaturated. The nitrous acid uniting with calcareous earth, or foſſil alkali, falls in a white ſediment, while the vitriolic acid combines with the lead.

b. In its volatile ſulphureous ſtate. (See page 32.)

2. An ALKALI is alſo very ſeldom found in water in its proper ſtate.

a. When a *foſſil alkali* is preſent, it is more nicely detected by the ſyrup of violets, or infuſion of lacmus, than the former, theſe being turned green by the leaſt portion of alkali. If a conſiderable quantity of alkali were combined with

* This is ſo nice a teſt, that even mephitic air is apt to give it rather a brighter colour.

the water, it might be precipitated by a ſolution of calcareous earth, or by acids.

b. A *volatile alkali* may be diſtinguiſhed by a ſolution of corroſive ſublimate mercury in water, or in the nitrous acid; the alkali rendering the ſolution white, a precipitation of a white powder enſues, but no change is produced, when the alkali is the fixed or foſſil; or if any, the mercury will be precipitated in an orange, brown, or reddiſh powder; where there is a conſiderable quantity of the volatile alkali, the water turns blue by the addition of copper. When this alkali is in a very ſmall proportion, ſome of the water ſhould be diſtilled over.

3. NEUTRAL SALTS are frequently found in medicinal waters.

a. GLAUBER'S SALT, compounded of vitriolic acid, and fixed foſſil alkali, ſpirit of wine added to a ſolution of this ſalt, precipitates it in a white powder; but no change is produced by the addition of any alkaline ſalt.

b. EPSOM SALT, formed of the ſame acid, and the earth of magneſia, is often a compoſition in purging waters. Any alkaline ſalt, either fixed or volatile, turns this water milky or curdly; the alkaline ſalt uniting with the vitriolic acid, precipitates the earth of magneſia.

c. NITRE, is compoſed of the nitrous acid, and fixed alkali. Water containing this ſalt ſhould

be

be evaporated, and the nitre remaining may be known by deflagration, or by its making a crackling noiſe over the fire. When the nitrous acid is combined with calcareous earth inſtead of the fixed alkali, the earth may be precipitated by the addition of this alkali.

d. COMMON SALT, conſiſting of the muriatic acid, and foſſil alkaline ſalt. The acid of this ſalt is nicely detected by a ſolution of ſilver in the nitrous acid; the muriatic acid, having a nearer affinity with ſilver than the nitrous, unites with the ſilver, which falls down in a white ſediment, while the nitrous acid joins with the alkali of the common ſalt. It is proper to have a redundancy of the nitrous acid in the ſolution of ſilver, leſt the ſilver be precipitated by a calcareous earth, which may be in the water.

III. EARTHY SUBSTANCES.

a. CALCAREOUS EARTH, or calcined LIME-STONE, is found in moſt wells and medicinal ſprings; the preſence of which is beſt diſcovered by a ſolution of lead in the nitrous acid. This acid ſhould be ſaturated with as much lead as it will diſſolve, leſt the ſuperfluous acid ſhould ſaturate the earth, and prevent the precipitation of the lead. If there be any calcareous earth in the water, this ſolution turns it milky, and after ſome

ſome time a white powder is depoſited, the calcareous earth precipitating the lead, by uniting with the nitrous acid.

b. If calcareous earth be ſuſpended in water by combination with the vitriolic acid, gypſum, or ſelenites is formed, which may be diſcovered by the addition of alkaline ſalt to this compound; the mixture ſhould be warmed a little, to promote the precipitation of the ſelenitic earth.

c. The ſame acid united with argillaceous earth, or earth of alum, produces an aluminous auſtere compoſition; and the earth may be precipitated alſo by alkaline ſalt, which uniting with the vitriolic acid, allows the earth to fall down in a ſediment.

IV. SULPHUREOUS.

SULPHUR may be ſuſpended in its proper form, though it is not ſoluble in this ſtate; but when the principle of inflammability in ſulphur is combined with calcareous earth, or any alkali, in the form of an hepar ſulphuris, it readily diſſolves; in which caſe the water ſmells diſagreeably, like the ſcourings of a gun, or putrid eggs. It is diſtinguiſhed alſo by a ſolution of ſaccharum ſaturni (ſugar of lead) in the nitrous or vegetable acids; a little of this ſolution being marked

marked in lines on paper, and the paper ſuſpended over the water, the volatile ſulphureous fumes riſing from the water turn theſe lines of a brown or dark colour; the inflammable matter of the ſulphur uniting with the lead in the ſolution of the ſaccharum ſaturni, partly revives the metal, and hence produces that dark colour. (See Sect. V. page 39, 40.)

V. BITUMINOUS BODIES.

Bitumen frequently runs from amongſt rocks; whence it is called petroleum; it is alſo common in the bowels of the earth, as hath been often fatally experienced from thoſe bituminous vapours called fire-damps, which prove inflammable, and therefore different from mephitic air, the latter extinguiſhing fire. Whether this inflammable vapour is formed of the principle of inflammability of ſulphur and the vitriolic acid in a volatile ſtate, is not ſo well aſcertained as the remarkable effects produced by theſe bituminous bodies in the mountains of Ætna, Veſuvius, and many others mentioned in hiſtory.

Liquid bitumen, naptha, or petroleum, is never found combined with water, but floats on its ſurface in a manner evident to the eye, and particularly may be diſtinguiſhed by taſte and ſmell.

VI. METALLIC SUBSTANCES.

a. Iron is a common ingredient in mineral waters, whence they are called chalybeate. The general method of diſtinguiſhing this metal, is by an infuſion or powder of galls, which turns water containing iron of a purple or black colour, deeper in proportion to the quantity of iron preſent.

But the moſt accurate method, is by means of the Pruſſian alkali*; fully ſaturated with the inflammable matter of the dried blood. This alkali mixed with a chalybeate water turns the latter immediately blue, and depoſits the iron in a powder of the ſame colour.

b. Copper in water is precipitated in a red powder by the ſame alkali.

c. Zinc is precipitated in a white powder by the Pruſſian alkali. Although this alkali precipitates all the metallic ſubſtances from acids, ſo that they may be diſtinguiſhed from one another, it does not any of the earths.

d. Arsenic has been ſuſpected in ſome mineral ſprings, but I am acquainted with no proof of it.

* The Pruſſian alkali is made of equal quantities of dried ox-blood, and fixed alkali. Theſe are to be burnt together in a crucible, and the aſhes diſſolved in a ſufficient quantity of water, when we enter on our experiments.

it. However, it may poſſibly happen that water running through arſenical veins, may carry off a quantity of arſenic. To diſcover this, the water ſhould be evaporated, and the reſiduum may be placed on a hot bar of iron, and if there be any arſenic, it is known by emitting a ſtrong garlick ſmell; or this reſiduum may be moiſtened with oil, and put between two bright plates of copper, which, when heated, are turned of a white colour, if any arſenic be preſent; but the ſmell generally affords a ſufficient teſt.

SECT. V.

Experiments on the CONTENTS *of the* AIR.

NOTHING is more evident than that our atmoſphere abounds with a great variety of ſubſtances, if we conſider the various exhalations conſtantly taking place from all vegetables; in prodigious quantities from all animal bodies; and the great variety of foſſil matters that are inceſſantly riſing in the atmoſphere.

To inveſtigate the nature of all theſe is impoſſible; in very few caſes can we find the exhalation of one kind only; and many of them are of little conſequence; for if we conſider the quantity that is conſtantly exhaling, and the powers many of them might have in acting upon the human body, we ſhould expect the effects to appear every moment to a conſiderable degree, which we find very far from being the caſe: there are certainly ſome means by which they are obviated: theſe exhalations are no doubt more or leſs diffuſed into the higher regions of the air; and probably alſo, from their mixture with one another,

ther, the moſt active come to be neutral and innocent. It is in few inſtances that the exhalations are not expoſed to the means of mixture; and it is but ſeldom, comparatively, that effects are produced upon human bodies, although in a particular manner immerſed in this vitiated atmoſphere.

There are, however, ſome impregnations in the atmoſphere, which daily experience ſhews have conſiderable influence on our bodies; for though they may not ſenſibly affect the more robuſt and ſtrong, they certainly do the weak and delicate. With a view to inveſtigate them more particularly, the following experiments were made in the beginning of Auguſt, in the year 1769.

For ſome preceding weeks the air had been generally warm and dry, and moſtly free from wind; the evening on which I began to condenſe the atmoſpherical moiſture was calm, and clos'd a fine warm day; the place where this moiſture was collected, was in a court about the centre of Gracechurch-ſtreet.

I procured a large glaſs globe perfectly clean on the outſide, into which I put a quantity of ice and ſal ammoniac powdered; the globe thus prepared, was ſuſpended in the air about five yards from the ſurface of the ground; the cold produced by the ice and neutral ſalt congealed the moiſture of the air on the external ſurface of the globe in the

the form of ice. This condenſed body was carefully ſcraped off with a ſilver ſpatula, and received into a wide-mouthed bottle well rinced: when I had collected in this manner ſome ounces of condenſed matter, I proceeded on the following experiments.

EXPERIMENT I.

TO know if it contained any fixable or mephitic air, I put one ounce of the condenſed moiſture into a vial, the cork of which was perforated through the whole length, to admit the extricated air to paſs through: over the cork was tied a looſe bladder free from any air; I then placed the vial thus prepared, in boiling water; the heat of the water extricating the fixable air from the condenſed moiſture, it eſcaped through the perforation of the cork into the bladder, where it was collected; the quantity of this air occupied a ſpace, which of ſimple diſtilled water was equal in bulk to $1\frac{1}{2}$ drachm. The vial, upon weighing it after the ſeparation of the air, was reduced a few grains lighter.

To be more certain that a great part of this extricated air was fixable, or mephitic, I applied it to lime-water; a precipitation of calcareous earth enſued, which convinced me of the preſence of mephitic air. (See Sect. IV. page 28.)

EXPE-

EXPERIMENT II.

I TOOK a quantity of the condenſed atmoſpherical moiſture, which had not been expoſed to heat; with this I mixed ſome ſyrup of violets diluted; the ſyrup evidently became of a greener colour; which perſuaded me that no acid, but an alkali, predominated. (See Sect. IV. page 28.)

EXPERIMENT III.

BY mixing the condenſed moiſture with a ſolution of corroſive ſublimate mercury, the mixture became of a pale white, which proved the alkali to be volatile; for with a fixed alkali, no change could have been produced; or, if any, the mercury would have been precipitated in a brown or reddiſh powder, called *mercurius precipitatus fuſcus Wortzii.* (See Sect. IV. page 22, 23.)

EXPERIMENT IV.

A PIECE of paper marked with a ſolution of lead in diſtilled vinegar, was ſuſpended over a quantity

a quantity of the condenſed moiſture, while in a ſtate of evaporation; but no change taking place in the lines marked on the paper, I concluded no ſulphur or inflammable matter was detached. (See Sect. IV. page 30.)

EXPERIMENT V.

THE condenſed moiſture evaporated to dryneſs, yielded a browniſh ſaline body, which from ſome experiments (ſee Sect. IV. and VI.) appeared to be chiefly a compound ſalt of the vitriolic acid and volatile alkali, forming ſal vitriolatum ammoniacum; this I procured in the proportion of about $1\frac{1}{2}$ grain, in two ounces of the moiſture.

From what appears to be the contents of the city air, as above related, many particulars obviouſly reſult, which afford ſome inlight into the nature and cauſe of the different diſeaſes in the city from thoſe without. There is reaſon to preſume, that putrid effluvia are noxious to animal bodies; they may very often introduce a ferment into a ſubject diſpoſed to the putrifactive fermentation, and hence have a tendency to promote diſeaſes which ariſe from a putrid diatheſis.

Probably the effluvia of perſpiration, when accumulated in more confined places, as in goals, hoſpitals,

hoſpitals, and large cities, are liable to a further degree of putrifaction, and to be converted into peculiar miaſmata, which we very well know produce diſeaſes of this kind, as in caſes of goal fevers.

There appears from Experiment I. another material circumſtance, which, until very lately, we were unacquainted with; we find that in all fermentations, a mephitic air is detached, which has frequently proved a certain, and ſometimes ſudden poiſon to animals; it is therefore reaſonable to ſuppoſe, if taken in very largely, without proving a poiſon, that it may produce diſeaſes of very dangerous tendency, and particularly of a putrid kind. The ſame mephitic, or fixed air, ariſes from numberleſs and various ſources; it is exhaled from the earth; it riſes certainly from all breathing animals, probably from all burning bodies, and ſeemingly in a peculiar manner from the putrifactive fermentation.

SECT. VI.

Directions for collecting and diſtinguiſhing Foſſil Subſtances, including Earths, Stones, Salts, Inflammables, Minerals, and Metals.

TO write particularly upon theſe objects of natural hiſtory, is not the preſent deſign: a few general inſtructions may be ſufficient to direct a traveller in the choice of ſuch foſſil bodies as he may meet with. Wallerius, Woodward, Cronſtadt, Linnæus, and Da Coſta, may ſupply a more inquiſitive enquirer with the moſt extenſive information.

Many are diſcouraged from purſuing this part of natural hiſtory, owing to the great variety of objects it comprehends, and the numerous properties by which they are diſtinguiſhed. But theſe when attended to, appear much leſs complicated, and capable of being reduced to a few ſimple heads; ſimple in their nature, and uniform in their compoſition; all new combinations producing chiefly a change only in form, colour, and conſiſtence.

I. EARTHS

I. EARTHS and CALCAREOUS STONES.

A. CLAYS are ſoft earths; mixed with a quantity of water they form a ductile paſte; when burnt, they become hard and ſolid.

Theſe are various in their conſiſtence and colour, owing to their mixture with other bodies. Some, containing calcareous ſubſtances, effervesce with acids, which they do not when pure; and their variety in colour is owing to the addition of iron, or ſome inflammable matter, which may be ſeparated by waſhing and by heat.

a. Pipe-clay is of a ſoft unctuous nature, not gritty to the teeth. Here may be included the porcelane clay of which China ware is compoſed.

b. Boles, Tripoli, Terra Sigillata, Lemnos, and brick clay, are all different kinds of clay, more or leſs pure, in proportion to the mixture of other bodies they contain.

B. CALCAREOUS BODIES effervesce with, and are diſſolved by acids; by burning they are converted into lime.

a. They appear under many different forms, and are found in ſtrata in the bowels of the earth, and frequently in large beds, as lime-ſtone,

marble, &c. When lime-ſtone is of a brighter colour, it is called marble, diſtinguiſhed by authors into many varieties, ſome of the fineſt of which are met with in Greece, Egypt, and Italy.

b. Free-ſtone is generally calcareous, and cuts in all directions, of a concreted granulated ſtructure; found in large beds in the bowels of the earth, as Portland ſtone, &c.

C. SPARS are calcareous bodies, found in mines, attendant on ores, &c. when pure, of a glaſſy appearance, and often cryſtalized into polygonal figures.

a. Found alſo in the rents or veins of rocky matter, under a variety of forms, called calcareous ſpar, having a rhomboidal figure, without any acute or right angles. In ſome veins this ſpar is found very tranſparent, and is then called Iceland-cryſtal. When theſe veins are not entirely filled up with ſpar, there are cryſtals found in them of a cubical, pyramidal, and columnar form.

b. In caverns under ground in a diverſified form, ſometimes reſembling icicles, occaſioned by water containing earthy and ſtony matters diſtilling down theſe caves, and depoſiting the earth, &c. in theſe forms. Incruſtations likewiſe are included here; the ſtony ſubſtances ſuſpended

ſuſpended by the water being depoſited upon moſſes, roots, and branches of plants.

D. GYPSA * are firm concretions, eaſily ſcraped with a knife, do not effervеſce with acids, fall into a white powder in the fire, and concrete again with water into a maſs, which ſoon hardens, called plaſter, or ſtucco.

a. Sometimes diſpoſed in little grains, reſembling Epſom ſalt, or ſugar cryſtals. When gypſa are of a fine texture, and indurated ſo as to bear a poliſh, they are called alabaſters.

b. Of a fibrous texture, the fibres running parallel to one another, called fibraria.

c. Compoſed of thin clear tranſparent plates, eaſily to be ſplit, and flexible, by ſome called glacies mariæ, and improperly Muſcovy talc.

d. In the form of cryſtals; columnar, reſembling nitre; rhomboidal, *&c.* called ſelenites.

e. Gypſeous powder is alſo found ſuſpended in ſome ſprings, whence the water is uſually ſaid to be hard: this is procured by evaporating the water. (See Sect. IV. page 32.)

* Gypſeous bodies are not calcareous, though they are here placed under that head, after moſt writers. They are more properly neutrals, being neither vitrifiable nor refractory.

2. VITRI-

2. VITRIFIABLE BODIES.

THESE ſtrike fire with ſteel, and ſcratch glaſs. They do not effervesce with acids: the file alſo makes no impreſſion on them. By heat they vitrify, or become glaſſy.

A. FLINTY BODIES are found plentifully in ſtrata of ſand and chalk. The dark colour of black flints is owing to the inflammable matter they contain, for on burning they become white.

a. Stony ſtrata of a quartzoſe baſis, and the various kinds of granites belong to this head.

b. Whin-ſtone contains the quartzoſe baſis mixed with iron. This kind of ſtone is now uſed for paving the ſtreets of London. Sometimes it is found in a cryſtallized form, as in the Giant's Cauſeway in Ireland, and at Arthur's Seat near Edinburgh.

c. In gravel or pebbles, containing a proportion of ſand, diſtinguiſhed from the places where they are found, as the Egyptian, Scotch, *&c.* The finer ſort of them are known by different names, as agate, chalcedony, onyx, cats-eye, *&c.*

d. Cornelians,

d. Cornelians, and Mocha ſtones which are diverſified in their ſurfaces like trees and moſſes, are a purer kind of flinty ſubſtances. The jaſper likewiſe is included amongſt the flints.

e. Porphyry, wherein the flinty matter is ſo diffuſed as to render this ſubſtance opaque, is variegated like marble, but does not effervesce with acids.

B. Chrystals are bodies of angular or polygonal figures, pellucid, bright, reſembling glaſs.

a. Found in fiſſures of rocky ſtrata, and in the centre of pebbles. Theſe have a ſhort column conſiſting of ſix ſides, terminated with a pyramid.

b. Corniſh diamonds, Briſtol ſtones, *&c.* are alſo cryſtals, which are more or leſs valuable, according to their hardneſs, clearneſs, brilliancy, *&c.*

C. Gems are chryſtals of various colours, uſually found in ſmall bodies, hard, bright, and radiant, as the diamond, ruby, ſapphire, topaz, beryl, emerald, garnet, hyacinth, chryſolite, amethyſt, *&c.* Many of theſe are probably to be found in rocky ſtrata, and in the broken ſides of mountains both in England and Scotland, as well as in other parts of Europe.

3. APYRI,

3. APYRI, or REFRACTORY SUBSTANCES.

THESE do not ſtrike with flint, or effervesce with acids; they are not changed by fire, nor are they ſoluble in water.

A. TALCS are bodies which cohere ſlightly together, ſlippery to the touch, and ſo ſoft as to be eaſily ſcraped with a knife.

a. They are ſeldom found in large ſtrata, but are generally mixed with other bodies, as metallic ores, black lead, ſlate, whin-ſtone, *&c.*

b. Steatites, or ſoap-rock, feels like ſoap or tallow, is generally of a light, yellowiſh, or pale brown colour.

c. Serpentine ſtone differs from the preceding, in containing a quantity of iron in it, and is uſually found in ſtrata like marble.

B. MICÆ, or GLIMMERS, have a ſcaly texture, the plates moſtly running horizontally parallel, eaſily ſeparable. They are found of various colours.

a. Reſembling the Moſcovy glaſs, or glacies mariæ

b. Sometimes found in thick maſſes, of a dark, red, or grey colour, reſembling metallic ſubſtances.

C. ASBESTOS.

COLLEGE NORWICH.

C. Asbestos and amianthus, are bodies likewise unaffected by the fire. The former is the moſt flexible, and may be wove with the addition of hemp or lint into cloth, capable of enduring the greateſt heat; the lint is indeed conſumed, but the aſbeſtos remains unchanged. Formerly dead bodies were wrapped in this kind of cloth, when they were thrown upon funeral piles, to prevent their aſhes mixing with the common aſhes.

Amianthus is of a ſimilar nature, and has the ſame property of reſiſting the force of the fire. Theſe bodies are of various colours, white, green, yellow, brown, *&c.*

II. SALTS.

SALTS are fuſible or volatile in fire; ſoluble in water, and ſapid.

1. The ſimple ſalts are either alkaline or acid*.

A. Alkaline salts turn the ſyrup of violets, or an infuſion of purple flowers of a green colour, and effervеſce with acid ſalts.

* Some of theſe ſalts are not native productions; but as an acquaintance with theſe ſubſtances may prove an introduction to the knowledge of many uſeful chemical facts, a more general account is here given of them.

a. Foſſil alkali, ſo called from its being found in the earth, in large ſtrata, but in a compound ſtate. It is alſo in ſea ſalt, and may be procured from the aſhes of ſea weeds by burning. This ſalt is the *natrum* of the ancients.

b. Vegetable alkali, procured chiefly from the aſhes of land vegetables, whence are produced pearl aſhes, pot aſhes, *&c.*

c. Volatile alkali is diſtinguiſhed from the other two by its volatility, as it evaporates by heat before it becomes fluid. It is procured from putrid ſubſtances, particularly animal, and alſo from ſome ſubterraneous fires, the urine of animals, all horny and bony ſubſtances, and plentifully from ſoot.

B. Mineral acid salts turn the ſyrup of violets, or an infuſion of purple flowers of a red colour; they effervеſce with alkaline ſalts, and are only obtained in a fluid ſtate.

a. Vitriolic acid, or oil of vitriol, ſo called from vitriol or copperas, which contains this acid united with iron; is heavier than water, and colourleſs when pure. With the principle of inflammability it forms ſulphur, from whence this acid is chiefly procured.

b. Nitrous acid, or aqua fortis, is of an orange tawney colour. Expoſed to the air, it emits fumes of a fiery colour.

c. Muriatic

c. Muriatic acid, or ſpirit of ſea ſalt, is a colourleſs tranſparent fluid. Expoſed to the air, its fumes are white.

C. Beſides theſe, we may enumerate,

a. Vinegar, or the acetous acid, which has the general properties of acid ſalts.

b. Tartar is a dry ſaline ſubſtance, neither fuſible nor volatile; ſuffers no change from heat under the boiling point, or 212°. It does not readily diſſolve in water, nor does it affect the ſyrup of violets ſo much as the preceding acids.

c. Sedative ſalt has the properties of ſalts in general. We are in great meaſure ignorant of its origin. It is chiefly procured from borax, a ſubſtance that is brought from the Eaſt-Indies. Sedative ſalt is generally got in a cryſtallized form, reſembling ſnow, or bruiſed ſperma ceti.

2. Compound salts, or ſuch as conſiſt of an acid united with an alkaline ſalt, having the properties of ſalts in general. There are eighteen of theſe ſalts, which are enumerated in the following table.

	Vitriolic acid.	Nitrous acid.	Muriatic acid.	Vinegar.	Tartar.	Sedative ſalt.
Foſſil alkali.	Glauber's ſalt.	Cubic nitre.	Common ſalt.		Rochelle ſalt.	Borax.
Vegetable alkali.	Vitriolated tartar.	Nitre.	Digeſtive ſalt.	Regenerated tartar.	Tartariſed tartar.	
Volatile alkali.	Vitriolat. ammoniac.	Nitrous ammoniac.	Sal ammoniac.	Vegetable ammoniac.		

In this table the acids and alkalies point reſpectively to the ſalts which they compoſe. Thus the nitrous compound ſalts are placed in the ſecond column, under the nitrous acid; and on the left ſide the particular alkali, with which each compound ſalt is combined, and ſo on of all the others.

Theſe neutral or compound ſalts may be decompoſed by the addition of an acid or alkaline ſalt; and their attractions are in proportion to the order ſet down in the table: thus if we want to ſeparate a volatile alkali from an acid, either of the fixed alkalies will anſwer. There is no line drawn between the foſſil and vegetable alkalies, becauſe their powers of attraction are nearly the ſame. The acid ſalts are likewiſe placed in the ſame order of attraction; the firſt column or vitriolic acid, ſeparates the ſecond or nitrous acid;

acid; and this the third or muriatic acid, and ſo on of all the reſt.

III. INFLAMMABLES.

THESE are not malleable or ductile; ſoluble in oils; and flame.

A. Sulphur is found in all ores, except thoſe of tin, biſmuth, and cobalt. It is plentiful in ſtrata of coal, and is always diſcoverable from the ſmell it emits.

a. Mineraliſed with iron, it is called iron pyrites, marcaſite, or copperas ſtone, of pale, grey, and yellow colours, and ſtrikes fire with flint.

b. Mineraliſed with copper, the pyrites is of a ſparkling green colour, or of various hues like a rainbow, and does not ſtrike fire.

c. United with earths, clays, and ſtones, ſometimes in regular cryſtalliſed figures; or in round or ſquare maſſes.

B. Bitumens are either fluid or ſolid. Liquid bitumen iſſues out from crevices in mines, and takes fire by a candle; from this property it is known to miners by the name of fire-damp.

c. Naphtha is a bituminous fluid, found floating on the ſurface of ſome waters, particularly in Perſia, from whence it is chiefly procured.

b. Petroleum

b. PETROLEUM is thicker than the former, ouzes out of the crevices of rocks, whence it receives its name. It is frequent in Bavaria, Sicily, and France.

c. Pix judaica, or aſphaltum, is of the ſame nature, but hard.

d. Amber, and ambergris, are inflammable bodies, ſimilar to the foregoing. The former is found principally in Pruſſia. Ambergris is met with in the greateſt quantities in the Eaſt Indies, at Madagaſcar, Mauritius, Borneo, the Molucca iſlands, and on the Egyptian coaſt.

e. Jet and foſſil coal are nearly alike. The latter is ſufficiently known.

IV. MINERALS.

THERE are fourteen metallic bodies at preſent known, gold, ſilver, copper, iron, tin, lead, quickſilver, platina, antimony, zinc, biſmuth, arſenic, cobalt, and nickel. The ſix latter are brittle, diſtinguiſhed by the name of ſemimetals.

A. GOLD when pure is not ſonorous, nineteen times heavier than water, ſoluble in aqua regia, but not in the nitrous acid.

a. It

a. It is moſt frequently found pure, in its metallic ſtate, in thin plates, ſolid, cryſtalliſed, or in a powder, called waſh-gold, or gold duſt.

b. It is found in quartz, and ſometimes in marcaſite, and alſo mineraliſed with iron, quick-ſilver, and a mixture of zinc and iron.

The largeſt quantities of gold are brought from the Brazils and the Spaniſh Weſt Indies. This metal is found alſo in Hungary, Tranſylvania, and in many other parts of Europe, in red, yellow, black, or iron-coloured ſands. It is met with likewiſe in ſome rivers, as the Tagus, Ganges, Rhine, Saale, Niger, Danube, *&c.* called river, or waſh-gold.

B. Silver, when pure, is eleven times heavier than water, ſoluble in the nitrous acid, but not in aqua regia.

a. It is often found native or pure, generally of about ſixteen carats ſtandard.

b. Minera argenti vitrea, or glaſs ſilver ore, of a dark colour like lead ore, is ductile, and contains ſulphur.

c. Minera argenti cornea, reſembling reſin in colour, and containing arſenic.

d. Minera argenti rubra, a brittle red-coloured ore, containing arſenic and ſulphur.

e. Minera argenti alba, combined with arſenic, and containing more copper than ſilver, of a light

light grey colour, and of a dull ſteel-grained texture.

f. United with arſenic and regulus of cobalt, of different colours, brown and dark blue.

g. Mixed with lead ore, ſometimes in a white cryſtalliſed form.

Silver is found in all countries, but moſt plentifully in America, particularly in Peru and Potoſi.

C. Copper, when pure, is near nine times heavier than water, the moſt ſonorous of all metals, diſſolves in all the acids. The leaſt quantity of this metal in ſolution, turns blue by the addition of volatile alkali. The vitriol of copper is of a deep blue colour, called blue, or Roman vitriol.

a. Copper is found native in a ſolid or granulated ſtate, but more frequently in the ſtate of ore, of which there are various kinds, which may be included under the following heads:

b. Conſiſting of the pure calx of the metal, ſometimes with a little iron, which comprehends the minera cupri vitrea, and the minera cupri viridis, of a green or blue colour.

c. Combined with arſenic or ſulphur. This is ſofter, and more common than the former. It appears of a red, brown, duſky, or grey colour. Sometimes blended with quartz, flinty ſtone, *&c.* Theſe (b and c) are rich ores of this metal.

d. Containing

d. Containing more iron than copper, yet ſufficient of the latter to be wrought for it. This kind, called copper pyrites, is generally of a yellow colour reſembling marcaſite, or ſulphur pyrites, but is of a richer yellow than the iron or ſulphur pyrites. It is alſo ſofter, and does not ſtrike fire with flint like the iron pyrites. When broke, it ſhews the rainbow colours.

Copper ores are found in moſt countries, particularly in Sweden, Hungary, and Tranſylvania. Japan alſo affords a fine ſort of copper.

D. IRON is about eight times heavier than water, is attracted by one of its ores called the loadſtone. Its ſolution is turned of a black or dark purple colour, by galls and vegetable aſtringents. The vitriol of this metal is green, called green vitriol, or copperas. (See Sect. IV. page 34.)

a. Iron is ſometimes, though very rarely, found in its pure ſtate. The ore of the metal is found all over the world, moſt generally of a duſky brown colour. The purer ores are generally pale and yellowiſh, with white ſparkling appearances.

b. In moſt clays and ochres, and may be extracted from the aſhes of moſt animal and vegetable ſubſtances, and collected by the magnet.

c. Indurated amongſt ſome foſſils, in the ſtate of ruddle, blood-ſtone, *&c.* of blue, red, and brown colours. Emery is alſo an ore of this metal;

but one of the moſt remarkable of its ores is the load-ſtone.

d. Iron is found in countries abounding with coal, called iron ſtone, in which ſtate it is of a light brown colour, and on calcination becomes of a deep purple colour.

e. The ores of ſome other metals contain iron; the copper ores uſually contain more iron than copper.

E. Tin is a ſilver-coloured metal, ſeven times heavier than water, does not vitrify like lead, is malleable and unſonorous.

a. Cryſtalliſed tin ore, or grain tin, found in cryſtalline maſſes, commonly of a poliſhed ſurface, of a blackiſh brown colour.

b. Cryſtalline concretions, reſembling the foregoing, but of a lighter colour, and more unctuous on the ſurface; ſometimes in a cubic form.

c. Tin-ſtone, intermixed with a large proportion of ſtony and other mineral matters.

d. Mineraliſed with iron; and alſo with ſulphur and iron, called black-lead.

Tin is found in England, Bohemia, Saxony, and in Malacca in the Eaſt Indies.

F. Lead is above eleven times heavier than water, unſonorous, malleable, and very fuſible. It gives a ſweet taſte in ſolution.

a. Galena

a. Galena plumbi, or potter's lead ore, is a rich ore of lead, compoſed of flat planes, with cubic angles.

b. Steel-grained ore, is alſo a rich lead ore, containing ſilver.

c. Antimoniated lead ore, containing antimony, and having irregular ſtriæ, or radiated lines, like that ſemi-metal.

d. Lead is often found mixed amongſt calcareous earth; and likewiſe in ſome veins in the earth where cavities are formed, in white or yellow cryſtals.

G. QUICKSILVER, or MERCURY, is a fluid metallic ſubſtance, fourteen times heavier than water, eaſily diviſible, and evaporates in a heat below ignition, or before it becomes red hot.

a. Sometimes it is found in a pure ſtate, called virgin mercury, but this happens very rarely.

b. It is chiefly procured in an ore united with ſulphur, called cinnabar, of a red colour, and brittle.

c. Combined with ſulphur and copper, of a dark grey colour, and brittle glaſſy texture.

Cinnabar is found in Hungary, Tranſylvania, Carinthia, Bohemia, the Palatinate, France, Spain, Sweden, and probably in the Eaſt Indies and Japan.

H. PLATINA, PLATA SILVER, OR PLATINA DE PINTO, introduced into England in the year 1749. Is eighteen times heavier than water, difficult of fuſion, and hardens moſt metals on mixture, reſembles ſilver in colour. This metal is ſaid to be found in the gold mines of the Spaniſh Weſt Indies. [Vide Lewis's Philoſophical Commerce of Arts.]

I. ANTIMONY is the metallic mineral, and the metal ſeparated is called regulus of antimony, which is a ſemi-metal of a ſilver colour, conſiſting of brittle ſhining planes.

a. Native, pure, or regulus of antimony.

b. Mineraliſed with ſulphur, arſenic, and moſt metals, generally of a radiated, cryſtalliſed, or ſteel-grained texture; ſilver-coloured, red, brown, or duſky.

It is found in Bohemia, Saxony, Tranſylvania, Hungary, France, and other parts of Europe.

. ZINC, OR SPELTRE, is a white ſemi-metal, inclining a little to blueiſh, ſeven times heavier than water, bears the ſtroke of the hammer longer than any other ſemi-metal; ſoon evaporates by heat. United with copper, it forms prince's metal, pinchbeck, and braſs. The vitriol of this metal is white, called white copperas, or white vitriol.

a. Indurated

a. Indurated in a cryſtalliſed ſolid form of a greyiſh colour. It is alſo frequently found half indurated with a martial ochre, called lapis calaminaris, of brown, yellow, and red colours.

b. Mineraliſed of various colours, as mock-lead, black-jack, or mock-ore, *&c.* Sometimes it is met with in a ſcaly texture.

Zinc is found at Goſlar in Germany, and at Holywell, and other places in England. It is alſo brought from the Eaſt Indies, in a pure ſtate, called tutenague.

L. BISMUTH, or TIN-GLASS, is a ſemi-metal, of a white yelloviſh colour, and laminated texture; above ſeven times heavier than water, and very fuſible.

a. It is found plentifully in Saxony, and in leſs quantities in England, but it is ſcattered in arſenical ores very generally.

M. ARSENIC, wherever it is found, may be known by evaporation over the fire, as it gives forth a ſtrong garlick ſmell, very noxious in a large quantity. (See Sect. IV. page 35.)

a. Sometimes found pure, looſe, or indurated, of a pale or grey colour.

b. Mineraliſed with ſulphur, called yellow, or red orpiment. Sometimes it is united with ſilver, copper, or antimony. The richeſt ſilver ores abound with this ſemi-metal.

Arſenic

Arſenic is found principally in the Bohemian and Saxon mines; but the richeſt native orpiment is brought from Turkey and Natolia.

N. Cobalt is a ſemi-metal of a whitiſh grey colour, fine grained texture, hard and brittle, about ſix times heavier than water; ſoluble in aqua regia, the vitriolic and nitrous acids, and the ſolution becomes red. After the diſſipation of the arſenic from cobalt, and by calcination, the blue glaſs called ſmalt is procured.

a. Cobalt is found united with earths, arſenic, iron, and other metals of various colours, black, grey, violet, blue, or aſh-coloured. Sometimes it looks like melted ſcoria, or glaſs of a blueiſh grey colour, called ſlag cobalt. Sometimes cryſtalliſed in cubical figures; frequently it is found in a looſe friable ochre.

It is found moſt plentifully in Saxony, particularly in the diſtrict of Miſnia; but it is alſo met with in many other parts of Europe.

O. Nickel is a ſemi-metal, which was firſt diſcovered about the middle of the preſent century*; is about $8\frac{1}{2}$ times heavier than water,

* This metal was diſcovered by Cronſtedt. See the Royal Academy of Sciences at Stockholm, for the years 1751 and 1754.

of

of a coppery colour. It is found united with iron, arſenic, ſulphur, and particularly with cobalt and biſmuth. Its ſolution in the nitrous and muriatic acids is green. The vitriolic acid has little or no effect upon it.

In the preceding obſervations on foſſils, efferveſcence with acids, and ſtriking fire with flint, have been often mentioned: it would be neceſſary, therefore, for a traveller in ſearch of foſſil ſubſtances, to have with him a bottle of aqua fortis, or the nitrous acid, and a ſteel, to diſcover thereby on the ſpot certain properties of ſuch bodies as may be collected. A hammer alſo may be neceſſary to break ſtones, *&c.* that are too bulky to bring away.

A blow-pipe is likewiſe an uſeful article; by blowing long and forcibly through ſuch an inſtrument, upon the flame of a candle, by which the point of the flame may be directed againſt the body to be examined, it will frequently diſcover, whether it is a calcareous, vitrifiable, or refractory ſubſtance; and for greater preciſion, experiments for the ſame end may be afterwards made at the fire-ſide, on a charcoal fire, *&c.*

The collector ſhould alſo attend to as many of the following particulars as poſſible.

1. When any article is collected, mark it by a number, or ſome ſign of diſtinction, referring to a cata-

a catalogue, with all the particulars that may be known relative to it; as,

2. Where it was found.

3. In what quantity, whether ſcarce or abundant.

4. If on the ſurface of the earth, or at what depth.

5. In what poſition, whether horizontal, perpendicular, *&c.* And with what other foſſil bodies it was found, as clay, ſtone, ſlate, mineral, *&c.*

6. Whether in ſtrata, or in looſe nodules.

7. The depth and thickneſs of the ſtrata, how they incline, or to what points of the compaſs they tend; or if level or horizontal; whether they have perpendicular or horizontal fiſſures, and what foſſil bodies are contained in theſe fiſſures.

8. All high mountains and hills, eſpecially their ſides, are to be ſearched; the ſhores alſo of the ſea, with their banks, and the cliffs adjacent, and the falls of caſcades, rivers, and great gullies.

9. The ſituation of mines, pits, and quarries, whether in a valley or hill; and the diſpoſition of the ſtrata, whether horizontal, inclining, *&c.* their thickneſs, and the depth they lie, and what other foſſils are imbedded either in the ſtrata, or in the neighbouring caverns, fiſſures, partings, *&c.*

10. The

10. The waters of mines ſhould be examined, whether pure, taſteleſs, purgative, vitriolic, or chalybeate, *&c.*

11. The damps and ſteams of mines, and what are the conſequences or effects of them; in what ſeaſons and ſtate of the air they are chiefly obſerved; and what temperature the air bears in different depths of ſuch mines.

12. The account given by the natives, inhabitants, miners, workmen, *&c.* who may be acquainted with the ſubject.

SECT. VII.

Directions for taking off IMPRESSIONS *or* CASTS *from* MEDALS *and* COINS.

CHIEFLY owing to the coſt required for purchaſing a cabinet of medals, it has happened that the ſtudy of them has hitherto been confined, comparatively, to a few individuals. Another principal impediment to the cultivation of an acquaintance with them, has ariſen from the difficulty of underſtanding the inſcriptions, for want of a ſufficient knowledge of languages; on which account in particular, this ſtudy has been condemned by the illiterate as barren and uſeleſs; but ſuch as are acquainted with the advantages which have already reſulted from thoſe *nummi memoriales*, cannot heſitate a moment to aſſiſt a promotion of a more general purſuit of the ſubject *.

* Though the ſtudy of medals does not properly belong to natural hiſtory, this ſhort account of taking impreſſions from them, may prove acceptable to ſome travellers.

While

While Coloſſian ſtatues, and the hardeſt marbles, with their deepeſt inſcriptions, are deſtroyed by accidents, or by time, and paintings finiſhed with the higheſt colours quickly fade, a medal ſhall ſurvive innumerable accidents, and diſcloſe hiſtorical facts a thouſand years after ſtatues are crumbled away; and when nothing but the names of an Apelles, or a Praxiteles remain. Does not a ſingle medal, of which we are in poſſeſſion, give us greater light into hiſtory, than the once famous libraries of Alexandria and Pergamus, which are now no more? From theſe, and many other conſiderations, I would willingly contribute my endeavours to render this ſtudy more general, and conſequently more uſeful. I have tried a variety of methods to enable a young medaliſt to collect a cabinet, which may initiate him into the knowledge of medals and coins at a trifling expence.

The method of taking off plaſter of Paris and ſulphur impreſſions, is known to every body: the firſt is too ſoft to preſerve them from injury, and the brittleneſs of ſulphur is a greater objection.

I found by forming a coat or layer of thin metal over the plaſter of Paris, it would be a conſiderable defence. Tin is the cheapeſt and moſt convenient metal for the purpoſe, as it is ſufficiently flexible, and at the ſame time very

much reſembles ſilver. The tin-foil I have tried, is of the ſame kind with that uſed for ſilvering looking-glaſſes. It ſhould be laid over the medal or coin intended to be taken off, and then rubbed either with a bruſh, the point of a ſkewer, or a pin, till it has received perfectly the impreſſion of the medal; the tin-foil ſhould now be pared off round the edge of the medal, till it is brought to the ſame circumference: the medal muſt then be reverſed, and the tin-foil will drop off into a chip box or mould ready to receive it, the concave ſide of the foil, or that which is laid on the face of the medal, being uppermoſt; upon this pour plaſter of Paris made in the uſual manner, and when dry, the figure may be taken out of the box or mould, with the tin-foil ſticking on the plaſter, the convex-ſide being now uppermoſt again, in which poſition it is to be kept in the cabinet, after it becomes dry. To have an impreſſion very perfect, the thinneſt tin-foil ſhould be made uſe of *.

The impreſſions taken in the foregoing manner almoſt equal ſilver medals in beauty, and are very durable: if the box or mould † be rather

* This method does not in the leaſt injure any medal or coin.

† Chip boxes, uſed by apothecaries, anſwer this purpoſe, and may be eaſily procured. A ſlip of paper wrapped round any circular body with a flat ſurface, is equally convenient.

larger

larger than the impreſſion of tin-foil, the plaſter when poured on, runs round its edges, and forms a kind of white frame, or circular border round the foil, whence the new-made medal appears more neat and beautiful. If this tin-foil be gilt with gold-leaf, by means of thin iſinglaſs glue, or boiled linſeed oil, the medal will reſemble gold.

FINIS.